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ABSTRACT

This document contains 18 papers from the partnership for vocational education and training (VET) section of an international conference on VET for lifelong learning in the information era. The following are papers are included: "School, TAFE (Technical and Further Education), and University Links, in Pursuit of a Seamless Pathway" (Robert Player); "Work-Based Training: Experiences of Student Interns" (Marcelle Hardy, Carmen Parent, Johanne Forget); "A New Model for Workforce Development: University of Nevada Las Vegas Educator Externship Program" (Sterling Saddler, Gina M. Toth, Lisa M. Bybee); "Workplace Learning as an Investment in Human Capital" (Johanna Lasonen, Reijo Parikka); "Supporting Lifelong Learning; The New Integrated Scottish Qualifications System" (Maida Grant); "Key Policy Issues in the Promotion of Information Technology in Vocational Education: Some Lessons from the Five-Year Strategy in Hong Kong" (Kathleen S.K. Ng); " Vocational Education and Training for Operators of Modern Enterprises" (Qinxiang Gao, Meichi Huang, Heping Yu); "The Condition and Competency of Multi-Entrances for Personnel Training of Industrial Design Engineer in Taiwan" (Jui-che Tu); "Establishment of the Advanced Printing Technology

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Centre at Hong Kong Institute of Vocational Education (Kwun Tong)" (Lawrence W. Chan); "Profile of SME (Small and Medium Enterprise) Support in Hong Kong and the Setting Up of the Business Start-up Centre" (Robin Wong); "Attach Strategic Importance to High Quality Vocational and Technical Education" (Shengyun Yang); "Cross Disciplinary Continuing Professional Development" (Sai Hong Ko); "Attitudes of University Faculty Members toward Students with Disabilities" (Marie F. Kraska); "Mobility, Flexibility and Accessibility of Postsecondary Education in Hong Kong" (Shui-Kin Chan); "Vocational Education in Engineering in the Information Age" (C.W. Woo, Alan S.T. Tang, S.T. Poposka); "The Engineering Graduate Training Scheme and New Technology Training Scheme in Hong Kong" (T.L. Ng, Gary M.Y. Wong); "Developing a Competitive Program to Cope with the 3C (Change, Competitive, Complex) Trend in Industry" (S.T. Tsai, Shu-Hsiao Tsen); and "How Effective Are Our Teaching Methods for Vocational Education" (Yik-lung Wong). Most papers contain substantial bibliographies. (MN)

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ED 446 248

Paper Presentations

Session E

Partnership for Vocational Education and Training

CE 080 848

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Vocational Education and Training for Life Long Learning in the Information Era

IVETA Conference 2000 Proceedings

Hong Kong

6 - 9 August 2000

SCHOOL, TAFE AND UNIVERSITY LINKS, IN PURSUIT OF A SEAMLESS PATHWAY

Robert Player

Hunter Institute of Technology, NSW. Australia

Index: Partnerships, schools, TAFE, university; seamless educational pathways

Abstract: The Hunter Institute of Technology is the largest supplier of workforce education and training in the Hunter Region of NSW, and one of the largest NSW TAFE Institutes.

One of the Institute's 16 campuses, the Central Coast Campus, is a joint venture of the University of Newcastle, The Hunter Institute of Technology, and the Central Coast Community College. In a number of other locations joint school and TAFE educational precincts are in various stages of development.

The Institute, in partnership with local schools and the University of Newcastle, has an established goal of developing educational pathways, which maximize student articulation and credit transfer. The movement from traditional articulation arrangements to those incorporating the concept of a seamless pathway represents a challenge for these partners.

The Issue Of Seamless Education.

Within the broader operating environment of the Hunter Institute of Technology, the creation of seamless education and seamless educational pathways has emerged over time as policy and planning issues.

These issues are arising in Australia at both the national and state levels, for example:

- An objective of Australia's National Strategy for Vocational and Education and Training 1998 – 2003 is to enhance mobility in the labour market. To this end "Seamless post compulsory pathways will be developed so that students will be able to move freely within the vocational education and training system, and between the system, senior secondary schools and universities." (ANTA, *A Bridge to the Future p3)*
- The Victorian State Government has established a Ministerial Committee on Seamless Education and Training. This committee will develop strategies across all compulsory education and training sectors to remove barriers to achieving a seamless education and training system in order to maximize educational mobility for all Victorians. (OTFE *Learning for Life* p1)
- Dr Ken Boston, Managing Director of TAFE NSW and Director-General of Education and Training has consistently proposed that within his portfolio the different points of focus and emphasis along the continuum of lifelong learning are no longer served by being rigidly compartmentalized into discrete elements. Barriers, which have prevented the use of, appropriate teaching staff, curriculum and facilities along the continuum of learning should be removed. (Boston, *"Why Schools and TAFE Need This New Award"* p4).
- The strengthening of links with schools, universities, other training providers and industry to create valued educational and employment pathways is a key strategic direction of TAFE NSW. (*TAFE NSW Strategic Directions 2000-2002, p2*)

A quick search on the web indicates that similar issues are being confronted in other locations for example:

- In establishing his Education Reform Study Commission in June 1999 Georgia 's Governor Barnes called for the commission to {..." create an education system that is truly seamless and refuses to allow so many students to fall through the cracks. The red tape and bureaucratic roadblocks and bureaucratic turf-guarding that keeps students from taking advantage of all that high schools and technical schools and two-year colleges have to offer must be eliminated." | (*Georgia State Plan for Vocational and Technical Education: FY 2001 – FY 2004* p3)
- In New Zealand the development of the National Qualifications Framework and new school curriculum is viewed by the government as part of its vision of a seamless education system which allows educational opportunities to flourish and to build an education system for the twenty first century. (Ministry for Education, New Zealand, *Education in the 21st Century p1*)
- In support of the government's "one-through road" education policy the Hong Kong Institute of Education plans to develop kindergarten, primary and secondary schools at its Tai Po campus. (*Hong Kong Standard*, 2000)

What Then Is Seamless Education?

Although there does not appear to be a universally accepted definition of seamless education, common themes are evident. The following quotes from the Victorian Office of Further Education and Training (OTFE), capture the core themes.

..."Seamlessness refers to the openness of sectors of education and training

to individuals from a range of educational backgrounds. A seamless education system is one in which each sector, while maintaining its distinctive purposes, has multiple points of entry and exit and thereby encourages lifelong education.

...It will address structural barriers between the school, TAFE, higher education and community sectors to ensure that individuals are able to move freely between the sectors on the basis of their prior learning and current competence.

...is a critical requirement of an education and training system that provides individuals with access to learning throughout their lives." (OTFE p1)

Seamlessness should be viewed from the perspective of the learner and seamless educational pathways are considered one of the necessary features of such a system.

The translation of these concepts into actual implementation of operational strategies and practices poses many questions at both macro and micro levels. For example, how would such a system be resourced? Would it require a restructuring of educational portfolios or structural changes to the supporting administrative systems? Is the concept contradictory to that of a competitive educational market? How will deviations, exits and entries along pathways consistently accommodate work and life experiences? What is the determinant of the speed at which an individual progresses? There are many such questions. Seamlessness is not a simple concept, and perhaps this is the reason that some governments are creating advisory committees and bodies to assist with the clarification, development and implementation of the concept.

Pursuing A Seamless Pathway.

There are significant challenges to be addressed if such goals are to be achieved. In the operational environment of the Hunter Institute the challenges that we face are not unique. Generic or common issues are clearly identified in a number of the papers including those of Doughney (1999) and Leahy (1999) presented at the First National Policy Conference of the Lifelong Learning Network, *Post-compulsory Education and Training; Looking to the Future. August 1999, University of Canberra.* The issues are consistent with Teese's (1999) report to the Victorian State Training Board. Identified issues include:

- TAFE Institutes are funded and accountable to the state government whilst universities are funded and accountable to the commonwealth government.
- Student aspirations and perceptions of the relative importance of higher education as opposed to vocational education.
- Attitudes differ between institutions and although the development of multisector institutions has widened opportunities, student mobility may be limited to localized arrangements. Localized arrangements may also lead to variations in arrangements and standards.
- Partial credit transfer arrangements do not represent a well-defined pathway.
- The introduction within the VET sector of National Training Packages, comprising competency standards, qualifications and assessment strategies may pose difficulties for universities in determining articulation arrangements.
- Differing staff employment conditions between the sectors can prejudice the operation of a seamless approach.

One factor, which directly impacts on the ability to move towards the creation of a seamless pathway, is the level of local cross-sectoral links and arrangements between the school, TAFE and University sectors. It is at this level where the Hunter Institute of Technology has concentrated its effort.

Partnerships And Pathways For The Hunter Institute Of Echnology.

The Hunter Institute of Technology has a number of structural features which are conducive to providing a seamless pathway along the traditional school, TAFE and University sectors.

First, all TAFE Institutes and schools in NSW are part of one government entity. The Department of Education and Training spans the continuum of education from early childhood education to TAFE and community education.

Second, in a number of the 16 delivery locations of the Institute there are several locations where schools and campuses are on adjoining or common sites and consequently educational precincts are in various stages of development.

Third, one of the Institute's campuses, the Central Coast Campus, is a joint venture of the University of Newcastle, the Hunter Institute of Technology and the Central Coast Community College.

These structural features facilitate partnerships (though not necessarily educational) arrangements and links. There is no guarantee that co-location will deliver seamless pathways.

The Traditional Approach To Educational Pathways.

The Institute and its partners have traditionally approached pathways on the basis of credit transfer arrangements from school to TAFE and from TAFE to university. Although this type of arrangement can lead to a pathway it is likened to one with a series of gates separating the three sectors. To move from one discrete sector to another the student must approach a separate gate where credentials are checked, credit given for certain parts of previous study, entry permitted and a new course undertaken in the new sector. Such a pathway is primarily based on one way traffic, with an assumption of an educational hierarchy.

These arrangements have in their own right been very successful. There are extensive school/TAFE credit transfer arrangements, which have been established on a statewide basis. Joint School TAFE programs have also been a feature, 3000 school students in 1999 undertook vocational programs delivered by the Institute.

TAFE/University credit transfer arrangements exist on a statewide basis and also are extensive. These arrangements have been significantly improved by direct interaction between individual Institutes and local universities. In the case of the University of Newcastle and the Hunter Institute of Technology 41 out of 46 of the University's degree programs have credit transfer arrangements from TAFE studies to the University. The majority of the arrangements are based on the successful completion of the TAFE course and TAFE students must meet university admission requirements and gain selection. Arrangements are also in place for the recognition of University subjects within Institute programs. The success of these arrangements can be seen in relation to students moving along a pathway from the Institute to the University of Newcastle, where:

- There has been an increase in offers and enrolments by TAFE sourced applicants every year since 1996.
- In the year 2000, of the 287 TAFE sourced enrolments, over 70% came from Hunter Institute Campuses, a similar figure to 1999.
- 37% of this year's TAFE sourced enrolments were TAFE students in 1999 (up from 35% in 1999).

It is interesting to note that 1323 university graduates enrolled in the Institute in 1999, and a further 1913 enrolled who had started but not completed a degree program. The Institute had 50387 enrolments in the year.

The Movement From Traditional Arrangements In Pursuit Of A Seamless Pathway.

Despite the unique structural arrangements the Institute and partners have at this point not been able to create a truly seamless pathway. It has been our experience that the challenges or barriers that are listed above do exist and the degree to which they can be overcome is variable. The movement from variations of the traditional arrangements is difficult. However, in a number of areas there has been significant progress.

The introduction in Semester 1, 2000 of the Bachelor of Applied Information Technology at the Central Coast Campus represents a significant change from traditional credit transfer pathway arrangements. The Campus is a joint venture between the University of Newcastle, the Hunter Institute of Technology and the Central Coast Community College. These partners envisaged that the Campus would offer a "seamless web of education". (*Campus Review* 1997). Consistent with

this vision the Director of the Central Coast Campus initiated the development of the Bachelor of Applied Information Technology program.

The Bachelor of Applied Information Technology has broken new ground in cooperation between the University and Institute and introduced a new dimension to the concepts of articulation and pathways. The program integrates TAFE and university studies.

The degree offers Information Technology (IT) subjects, together with a major study in another discipline of the student's choice, from a broad range available at the Campus. The degree allows students to combine their degree major with the critical underpinning of IT, for example marketing/IT, human resource management/IT, hotel management/IT. University and Institute IT staff were parties to the development of the program and undertake the teaching and coordination of the IT component. For the students it is an apparently seamless program. IT modules across two of the three years of the degree program are drawn from TAFE curricula and taught by Institute staff. Approximately one third of the program, overall, is drawn from TAFE components and delivered by Institute staff.

If students choose to convert their study from the Bachelor of Applied IT to one or more TAFE qualifications, credit is given for those IT subjects already successfully completed. Students who have completed one or more TAFE qualifications are granted credit consistent with the University/TAFE articulation arrangements.

In the development and implementation of this program the issues clearly identified by Doughney (1999) and others were encountered. Many were able to be overcome by the fact that the Central Coast Campus has one administration, common facilities and infrastructure. However the program is not a seamless pathway but rather a seamless program. For the Institute and the University it is an extremely innovative integrated program, which is forcing us to address the administrative and educational issues which must be overcome if a pathway is to be truly seamless.

Administrative issues have in the main been overcome by the fact that the course is a university program, managed by the University and the students enrol in the degree program. The TAFE IT modules have been packaged as 8 university subjects but the students must also enrol in the Institute, pay the Institute administrative charge, and receive both TAFE and University results. Student attendance is in accordance with the university calendar (which differs from the standard TAFE calendar). This is not a problem for the students as all activity occurs within the environment of a completely integrated campus, however, it has required considerable initiative and flexibility by the staff of the teaching and administrative sections.

The program was designed to blend vocational and academic skills, TAFE providing the vocational emphasis " computing for the here and now" which is then built on by the university subjects. All TAFE IT subjects are in the first 4 semesters of the 6 semesters. An essential component was the maintenance of the pedagogical practices of TAFE: smaller classes, teachers with an industry background and orientation, a practical and hands on emphasis, classroom interaction and individual attention. The students, although in the strict sense university students, when undertaking TAFE subjects were to be taught and treated as TAFE students. In practice this has presented a major challenge for the TAFE teachers in adopting an appropriate teaching strategy. Many students when entering the program view themselves as university students expecting a large scale lecture situation with optional attendance which is in contrast to small interactive TAFE classes with more continuous assessments. TAFE teachers consider the program a stimulating program in which to work. The potential problems arising from the different cultures of TAFE teachers and University lecturers has largely been overcome due to a "one staff" management philosophy of the Director of the Campus.

Formal evaluation of the program will occur in line with standard accreditation procedures and there will be ongoing review. In relation to the seamlessness of the program and in the context of a

seamless pathway there are a number of improvements and modifications that will need to be accommodated. Entry and exit points for the program are essentially limited to entry to a degree program, with standard credit transfer arrangements, exiting with degree, TAFE statement of attainment or partial completion of each. The program is localized within one faculty and campus, yet this may be an advantage in a competitive education market.

Consideration is already being given to these issues including the integration of vendor qualifications (one of the Institute campuses is a Regional Cisco Academy) and connection of elements of the program to another degree program. At a time of the broadening of the NSW Higher School Certificate and an increased emphasis on vocational education within the school system, the involvement of schools and school students is also under consideration. Submissions have been made to secure funds for technology to enhance cross sector training and will potentially provide the mechanisms to improve the seamlessness of the program and also move it from its current localized base.

CONCLUSION.

The Hunter Institute of Technology does not operate within a seamless education system nor does it have seamless pathways. However the concept of seamlessness is recurrent at all level of operations and is causing us to rethink our traditional ways. Whilst there may be structural barriers to a seamless education system and pathways, and the concept itself may not be clearly defined, it is a concept which can be used to challenge existing arrangements. It may well be something that is not attainable, but rather something to which to aspire. Close links and partnerships with schools and university have enabled the Hunter Institute of Technology and partners to develop programs and pathways that exhibit many of the characteristics of seamlessness. The Bachelor of Applied Information Technology is such a program and presents an exciting opportunity for students and teachers. Whilst it cannot be the sole criterion, the aligning of programs and pathways against this concept of seamlessness can only add to the value of the program. The Institute will continue to build on these programs and with its partners pursue a seamless pathway.

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WORK-BASED TRAINING: EXPERIENCES OF STUDENT INTERNS

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Index: Work-based training, mentor, trainee, qualitative analysis, and vocational education

Abstract: Work-based training is studied via qualitative interviews with 25 students in four vocational training programs, who were met first in school, then in the workplace. Following a description of the internship periods undergone by the students, the process of work-based training is analyzed. The progression of internships and learnings, as described, demonstrates that the activities assigned to the students have enabled them to increase their knowledge and begin their integration into the labor market. The study also examines the students' development at the hands of their mentor and other employees, highlighting the difficulties they encounter.

INTRODUCTION

In Quebec, as in a number of other jurisdictions, work-based training occupies an increasingly important place in the education of students pursuing a vocational or technical diploma. Here we present an analysis of the experiences of students involved in training administered alternately at school and in the workplace. Following an overview of the problematic and the frame of reference guiding our work, we describe the methodology we employed, as well as the characteristics of the students we met. The alternance training model, as it is applied in Quebec, and the characteristics of students' internships are also identified. We then proceed to an analysis of the work-based training process, separate from the students' testimonials. Finally, we examine the training relations that have been woven among the student, his or her mentor in the workplace, the other employees and the teacher at school. We conclude by highlighting some of the difficulties encountered by the students.

1. PROBLEM STATEMENT AND THEORETICAL FRAMEWORK

The necessity of better links between academic education and demands for qualified labor has prompted experimentation with various forms of school-workplace partnership in vocational education. These partnerships have allowed for the delivery of *alternance training*, *cooperative education* and *work-based learning*. Studies into such work-based training experiments have mainly examined the perspectives of teachers (Gérard, 1999) or workplace mentors (Agulhon & Lechaux, 1996; Geslin & Liétard, 1993). Having ourselves already analyzed the experiences of school administrators (Hardy & Parent, 1998) and of mentors (Hardy & Parent, 1999b), as well as of teachers and mentors involved in supervising students (Hardy & Parent, 1999a), we now seek to understand the experiences of student interns involved in such vocational high-school education. This includes several internships, wherein the educational periods in the workplace are alternated with periods of vocational training dispensed in the school environment. Our research question is as follows: What are the characteristics of the learning process of students involved in alternance training or work-based learning?

The chosen framework of reference allows for the examination of students' views on their work-based training experience, as well as on their relations with their mentor in the workplace, the other employees and their teachers. This investigation is inspired mainly by the work of Evanciew & Rojewski (1999), Lechaux (1995) and Stasz & Kaganoff (1997), who studied the experiences of students involved in youth apprenticeship, alternance training or work-based learning programs. The present analysis also draws on the work of Grubb & Villeneuve (1995) and that of Lasonen (1999), wherein the authors investigate the advantages of work-based learning for students. Our analysis concentrates on the modes of actualization of students' work-based learning process, on students' self-evaluation with respect to difficulties encountered and learnings acquired in the workplace, as well as their workplace training relations with their mentor, the employees and their teachers.

2. METHODOLOGY

This study involving the vocational training students is part of a research project into school-workplace collaboration in secondary education, wherein we utilize a case-study approach (Stake,1995). The cases studied or the units of analysis in this research project are study programs. In the current analysis, we focus our attention on curricula involving alternating periods in the workplace. These specific programs are taught in three Vocational Training Centers located on the Island of Montreal. We analyze the viewpoints of 25 students, broken down as follows into one of four vocational high-school education programs[1]: Drafting (n=8), Modeling (n=7), Jewelry-Making (n=6) and Office Skills (n=4). Each of these 25 students granted us an initial interview of 30 minutes during the penultimate month of their school-based studies, and a second interview of 15 minutes during the second part of their last internship in the workplace. The recorded interviews were processed using NUD*IST software.

3. CHARACTERISTICS OF THE STUDENTS

Gender representation varies according to the study program. Two-fifths of the students are women (n=10) and three fifths are men (n=15); however, the women are enrolled in office skills (F, n=4) and jewelry-making (F, n=5), while the men are to be found in drafting (H, n=7) and modeling (H, n=7). A ten-year age gap separates the youngest from the oldest within the group, the average age being 28.3 years. The jewelry-making students are aged, on average, 23.2 years, whereas those in modeling are, on average, 33.3 years old. Between these two groups are the drafting students, with a mean age of 26.4, and the secretarial students, with a mean age of 30.5. The average age of these students is slightly above the provincial average for Quebec students. This figure can be attributed to educational policies in place since 1988, which integrate youths and adults in the same vocational classes, in order to offer a wider variety of programs and maximize returns on investments in equipment for workshop classes.

Prior education is relatively homogeneous in three of the four programs. At the time of their enrollment, four-fifths of the students (n=20) already possessed a diploma of general (n=17) or vocational (n=3) studies. The other fifth (n=5) had completed college (n=2) or university (n=1) studies, or held no diploma at all (n=2). More than a quarter of the students (n=6) had also

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[1] - Drafting prepares students for architectural trades; Modeling offers instruction in the manufacture or modification of wooden, plastic casting or reinforced plastic models, used in the fabrication of molds for metal or plastic casting; Jewelry-Making provides training in jewelry design and creation and Office Skills prepares student for secretarial work.

interrupted other college or technical studies. Half of these students were finishing studies in drafting (n=3). Over a third of these graduates (n=9/25 or 36%) had thus returned to pursue vocational high-school studies after having abandoned (n=6) or completed (n=3) college or university studies. As for work experience, the majority (n=24) had acquired it through full-time employment (n=19). The average duration of such full-time work was 5.61 years. The students in jewelry-making (1.63 years) and drafting (4.33 years) had significantly less work experience than those in modeling (8.5 years) and office skills (10 years).

4. ALTERNANCE TRAINING MODEL AND INTERNSHIP CHARACTERISTICS

Work-based alternance training is at once a pedagogical strategy and a method of organizing vocational education and training. The model applied in Quebec has been mainly inspired by that applied in France. It also shares similarities with the Co-operative Education, developed in the United States. This alternance training is characterized by the structured combination of periods of training in an educational establishment and internship periods in the workplace. Within this general framework, several different forms of alternance may be observed, wherein the number of internship periods may vary from two to four, and the total duration of these internships may range from seven to sixteen weeks. The integration of alternance training within a vocational program may be intended mainly to facilitate the acquisition in the workplace of competencies set by the curriculum, or to transfer competencies already acquired to a real-world setting, as well as to facilitate students' transition from learning to practicing their chosen occupation.

The application of the alternance training model varies as follows in the four programs studied: the jewelry-making and drafting programs offer four internships of four weeks each, or sixteen weeks of work-based training; the modeling program includes three internships lasting one, two and three weeks, respectively; and the office skills program integrates two four-week internships. The jewelry-making instructors benefit from an agreement with a major jewelry studio in Montreal that accepts the majority of students in this program. The students in this studio realize a project they developed in class. The students in the other programs are dispersed throughout various companies in their industrial sector, where they carry out tasks assigned to them by the accepting company. To these distinctions among the programs are added the particularities of the students themselves. In jewelry-making, 5 of the 6 students completed their internships in the workshop paired with their school, but the number of their respective internships varied from two to four (2 internships, n=2; 3 internships, n=1; 4 internships, n=2). This is largely attributable to the selection made by the instructors, who refer only the best students. The last student was refused by the target studio for security reasons, and was able to complete only one internship in a family-style studio. In drafting, the majority of students (n=5) completed all four scheduled internships with a single company (n=3) or with two or three different companies (n=2). The other students (n=3) completed only two internships with a single organization. In modeling, all the students completed their three internships with three different companies whereas, in the office skills program, all the students completed their two internships, but half (n=2) changed companies for the second one. The organization of work-based internship periods and their duration vary for each program studied. This multiplicity of approaches to applying workplace training has also been observed by Brochier, Froment & d'Iribarne (1990) in regard to alternance training in France, and by Stasz & Kaganoff (1997) in the context of work-based learning in the United States.

5. WORK-BASED TRAINING PROCESS

Four steps are identified in the work-based training process: 1) preparation and progression of the internship; 2) self-evaluation of the internship; and 3) vocational plans.

5.1 Preparation and progression of the internships

Preparation for the internship includes training received at school, and the search for an internship. The students in all four programs were satisfied with the preparation they received at school prior to their various internships. Nearly half of the students (n=12), however, expressed reservations, stressing the limits of their preparation, to which they attribute certain difficulties they encountered. They note in particular the differences between the tools or instruments they used at school and those that were available to them in the workplace. As for their internship search, the majority of students (n=18) were assisted by the school in securing all of their internships. Several students (n=14) also emphasized the personal initiative they took in approaching organizations.

The progression of each internship begins with the welcome into the organization and is followed by the student's engagement in the internship. During all their internships the vast majority of students (n=21) felt warmly received by the people in their internship environment. They particularly appreciated being invited to participate in the work of the company (n=8) and being able to benefit from the availability of personnel to obtain assistance (n=9). Whichever the internship in question, the tasks performed by the students were varied and corresponded to the job functions learned in school. Almost 7 in 10 students (n=17) further acknowledged that the work assigned to them either was more complex than what they done in school, or corresponded to tasks they had not yet learned. Nevertheless, one third of students (n=9) carried out their assigned tasks with ease, and several (n=7) emphasized the openness of company personnel vis-à-vis questions posed by the interns. These testimonials by the students confirm an earlier analysis wherein the mentors affirmed that they "direct the intern towards tasks that require participation in productive activity and the use of a variety machines and tools." (Hardy & Parent, 1999a, p. 12)

5.2 Self-evaluation of the internship

In evaluating their internships, the students spoke of the difficulties they encountered and the learnings they acquired. With respect to difficulties, the majority of students (n=20) experienced negative aspects in one internship period. During their initial internships, they mainly noted a lack of cooperation from their mentor or company employees (n=7), or their assignment to relatively unstimulating tasks (n=3). In their final internship, they pointed instead to the challenge of overcoming the stress they felt as a result of the relatively complex tasks assigned to them (n=6).

With respect to the learnings acquired during their internships, the students emphasize the acquisition of practical knowledge (n=19), such as new techniques, methods of work, "tricks of the trade" or putting into practices what they had seen in school. They then underline their familiarization with norms relating to the dynamics of the labor market or their occupation (n=9), application to the work in order to meet set objectives (n=6), increased self-confidence (n=5), the development of communication and teamwork skills (n=3) and autonomy (n=3). The learning most often cited reflect the two main stated objectives of alternance training, namely, the acquisition or transfer of competencies set by the study program, and the progressive integration of the student towards practicing the chosen occupation.

5.3 Vocational plans

When the students are invited to specify their vocational plans, the majority (n=15) express a desire to work in the company where they completed their internship. The others hope to find employment in their field of study (n=5) or continue their studies to college-level studies (n=5). Over three-quarters of the students (n=21) consider their internships as a valuable means of transitioning towards future employment; indeed, four of the seven modeling students received offers of employment with the company where they completed their final internship. The students mainly explain the internship's integration-to-work role through workplace integration skills acquired during their internships (n=10), and through references to the internship space as a means of valorizing their training (n=9).

We see no real differences in the work-based training process of the four groups of students. The description of the progression of the internship and associated learnings clearly demonstrates that the activities assigned to the student allowed them to acquire knowledge and to transfer, in a real work situation, the competencies acquired at school, while simultaneously allowing them to begin their integration into the labor market. The students' testimony as to their vocational plans is also eloquent in favor of integration to work, in that the majority of students hope to continue working in the same company which accepted them as interns,

6. WORKPLACE TRAINING RELATIONS

Training relations in the workplace are a manifestation of the type of student training offered by the internship. The students were invited at two separate junctures to describe their relations with their mentor, the other employees and their teachers. In the first interview, at school, nearly three-quarters of the students (n=18) highlighted the assistance they received from their mentor. According to their reports, this support relationship took the form of an attitude of openness that put students at ease, attentiveness and responsiveness to questions, the imparting of "tips and tricks" and the communication of methods of work, as well as patient behavior in the face of challenges, encouragement, explanation and relevant advice. A minority of students limited themselves to describing their relations with their mentor as good or satisfactory for purposes off completing their internship (n=3), or complained of being left to their own devices and of not having received the necessary assistance during at least one of their internships (n=4). During the second interview, in the workplace, half of the students (n=13) continued to characterize their relationship with their mentor as supportive, while the other half (n=12) claimed to be merely satisfied with the guidance they received from their mentor. A third of these students (n=8) also regretted that their mentors were too busy with their own work to have time to sufficiently attend to their interns' needs.

The students' relations with the other employees appear complementary to those with their mentors, and borrow the same configuration. Nearly two-thirds of the students (n=16) qualify these relations as helpful and appreciate having thereby received supplementary training that fleshed out answers to their questions, put them at ease, etc. The other third of students considered their relations to be good or normal (n=5) or stated that they had little or no relations with other employees (n=4). The majority of students thus received almost as much training from other employees as from their mentor. The work environment as a whole became a source of training and the students were able to benefit from more consistent guidance.

In alternance training, a teacher or internship coordinator is intended to visit the student during the internship. During the first interview, some of the students (n=11) had benefited from all of the planned visits, and some (n=11) had not received a visit from the teacher during one of their internships. Almost half (n=11) found these visits helpful, as the instructor spoke with them about

their work, offered them some advice, encouraged them and boosted their self-confidence. One quarter of the students (n=6) considered these visits satisfactory and another quarter (n=6) were indifferent to the visits. A minority of students (n=7) expressed several misgivings (n=15) which mainly centered on the bad mood or lack of patience of their teachers (n=4), their lack of readiness to provide assistance (n=3), an overbearing manner that left insufficient room for autonomy (n=3) and occasionally difficult communications (n=3). Seven students, however, reproached their teachers for being insufficiently available, keeping visits too short or not coming to meet with them.

Overall, the students reported having very supportive relations around their work-based training experience. They particularly appreciated the training provided by their mentor and other employees of the host company. They are, however, more severe vis-à-vis their teacher, whom they reproached, among other things, for a lack of availability and patience.

CONCULSION

Since any training experience can be improved, we have, by way of conclusion, grouped together the criticisms expressed by students about the various aspects of their work-based training. The negative aspects highlighted by students relate to the training they received from their mentor and the contribution of the teacher who visited them during the internship. Some students deplore the lack of guidance received from their mentor during the initial internships and the understimulating tasks assigned to them. Would the company have greater difficulty integrating students who were less advanced in their study program? During the final internship, the students regret instead that their mentor has too little available time or is too busy. This fact is consistent with our analysis of mentors' accounts (Hardy & Parent, 1999b), wherein these individuals saw their role in training interns as going unrecognized by their employer, and themselves as failing to benefit from any lightening of their workload that would allow them to supervise their students. Finally, let us note that some students reproach the teacher who visits them for being insufficiently available, for not helping the students enough and for cutting visits too short or failing to visit at all. This last comment calls into question teachers' training with respect to the work-based training of their students and the recognition of this function within their job description. Teaching representatives, however, condemn the lack of time accorded teachers to guide their internship students.

These commentaries invite a reflection on current recognition for work-based training by the industrial and educational sectors. It seems, on the one hand, that some mentors and teachers would benefit from complementary training in the development of interns beginning their vocational training and, on the other hand, that the organizations and institutions involved ought to reorganize teachers and mentors' tasks to free up more time for them to devote to responding more adequately to the needs of students.

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A NEW MODEL FOR WORKFORCE DEVELOPMENT: UNIVERSITY OF NEVADA LAS VEGAS EDUCATOR EXTERNSHIP PROGRAM

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Index: Workforce Development, Educator Externships, Teacher Internships

Abstract: Educators and future educators must be a part of the continual career awareness and experience process of students and future students. Teachers need to know how their subjects can add to the employability of their students. This program provides a vehicle for school curriculum to be developed and implemented in all academic disciplines.

INTRODUCTION

This paper explains the Educator Externship Program and its purpose and goals. It addresses the benefits of the program for the educator, the schools and students, and the business community.

What are Educator Externships?

The Educator Externship Program is part of a community career awareness program aimed at better preparing students for the workforce of the 21st century. As a result of these experiences, educators will have new tools to ensure classroom learning experiences are more relevant to what goes on in the "real world." All students need to know about the world of work. As students gain insight into career options, they will be able to make intelligent decisions regarding their futures and how to make them a reality.

The Externship experience was designed using the SCANS skills. SCANS (Secretary's Commission on Achieving Necessary Skills) was developed in 1991 by the U.S. Department of Education. These provide a framework from which the Externship was developed and are a part of the skills teachers include in their lesson plans for the Externship and are used as a guide by teachers while participating in the minimum 50 hour on-site work experience. A list of the Three Part Foundations Skills is listed below:

Basic Skills: Reads, writes, performs arithmetic and mathematical operations, listens and speaks

A. Reading - locates, understands, and interprets written information in prose and in documents such as manuals, graphs, and schedules.

B. Writing - communicates thoughts, ideas, information, and messages in writing; and creates documents such as letters, directions, manuals, reports, graphs, and flow charts.

C. Arithmetic/Mathematics - performs basic computations and approaches practical problems by choosing appropriately from a variety of mathematical techniques.

D. Listening - receives, attends to, interprets, and responds to verbal messages and other cues.

E. Speaking - organises ideas and communicates orally.

Thinking Skills: Thinks creatively, makes decisions, solves problems, visualises, knows how to learn, and reasons.

A. Creative Thinking - generates new ideas.

B. Decision Making - specifies goals and constraints, generates alternatives, considers risks, and evaluates and chooses best alternative.

C. Problem Solving - recognises problems and devises and implements plan of action.

D. Seeing Things in the Mind's Eye - organises, and processes symbols, pictures, graphs, objects, and other information.

E. Knowing How to Learn - uses efficient learning techniques to acquire and apply new knowledge and skills.

F. Reasoning - discovers a rule or principle underlying the relationship between two or more objects and applies it when solving a problem.

Personal Qualities: Displays responsibility, self-esteem, sociability, self-management, and integrity and honesty.

A. Responsibility - exerts a high level of effort and perseveres towards goal attainment.

B. Self-Esteem - believes in own self-worth and maintains a positive view of self.

C. Sociability - demonstrates understanding, friendliness, adaptability, empathy, and politeness in group settings.

D. Self-Management - assesses self accurately, sets personal goals, monitors progress, and exhibits self-control.

E. Integrity/Honesty - chooses ethical courses of action.

The Externship is an opportunity for educators to reduce the barriers between the classroom and the workplace by spending a minimum of 50 hours at a business, labour, non-profit organisation, or government agency. These experiences in industry help educators become more informed about the range of career options open to their students and the knowledge, skills, and abilities needed to excel in the workforce. By working with a business, the educator will gain a new, hands-on perspective of the evolving competencies required in the work world.

During their externships, educators work side-by-side with employees in order to understand their major work responsibilities and the skills, knowledge, and abilities needed to perform effectively. The educators then use this information to connect classroom learning to the workplace and illustrate the relevance of career education to students' futures.

Goals and Objectives

The goal of the Educator Externship Program is to have all teachers (Academic and Occupational) understand how what they teach in the classroom relates to the business/industry world. Through a structured, supervised and coordinated experience, educators will be able to enhance their teaching strategies so that their existing curricula will be infused with current and evolving work-relevant skills. As a result of the experience, educators can better communicate to their students the skills, knowledge, and attitudes necessary to enter careers of their choice. This will allow students to see and understand the connection between schoolwork and their future careers.

Benefits

Externship experiences offer educators the chance to participate in self-directed professional development. Teachers are encouraged to enter an industry related to the subject matter they teach in order to develop an increased understanding of the specific skills their students will need in the workplace. Educators learn about the hiring and termination processes of businesses and the technologies at work in different industries. Emerging technologies, including networked computers and web-based technologies, have led to a rapidly changing workplace and teachers, counsellors, and administrators need to understand how these changes will affect students entering the workforce.

A teacher's experience in the workplace can have an impact on an entire classroom full of students. Educators bring this new knowledge back to the classroom, returning with an increased understanding of the opportunities and challenges students will face in the workplace. This enables the educator to help students select effective work-based learning activities, choose among career pathways or foci of study in high school, and make other important decisions about post-secondary education, training, and careers.

Educator externships provide a remarkable long-term investment for business and industry. Bringing teachers, counsellors, and administrators into the workplace allows businesses to learn about the schools in their area and help educators and business leaders develop a means with which to talk about and plan for further school improvement. With stronger lines of communication between schools and industry, schools can help direct students towards meaningful careers and businesses can reduce their long-term training and recruitment costs and increase their rates of staff retention.

The Educator Externship Experience

It is important that the educator and participating business partner share a set of clear, reachable goals for their time together. Educators gain insight into the ever-evolving requirements of the world of work and businesses are able to provide input to the education system by working collaboratively with the schools. Business partners are encouraged to allow the educator to participate in as many facets of the business as possible, giving the educator a more complete and well-rounded experience.

During the externship program, educators keep journals of their experiences to assist in later translating the experience into learning objectives for their classes. Through journal entries, educators can reflect on how what they did in their Externship job relates to their subject area and what teaching strategies they can use in the classroom to incorporate what they have learned. A sample journal entry is given below:

Sample Journal Entry:

"This ends my journal entries for this internship. I think that it was a very good learning experience for me because it allowed me to see trainers in action and to experience corporate training in an authentic setting. I really enjoyed talking with Wade about training and other educational issues. I am grateful that I had this opportunity.

What has come across in all of our meetings and in the training classes is that employees need to have some basic skills in the area of interpersonal relations. By that I mean that students who wish to go into hospitality must have a generally good outlook and personality and be able to take responsibility for their actions. Teachers in secondary school might address this by including

role playing in their lessons when covering hospitality topics in order to engender a sense of reality into the class."

Upon returning to the classroom, educators will have gained a new perspective on the relevancy of their subject area to the "real world of work." The experience in the business world grants teachers a greater sense of one of the key purposes of education: to prepare students for meaningful, fulfilling careers and personal economic success as contributing members of their community.

A Sample Lesson Plan for the Externship would include the competencies listed in SCANS and the Three Part Foundation Skills. The educator would have outlined these skills while fulfilling their 50 hour externship (through interviews and journal notes) thereby developing a lesson plan that addresses the skills and competencies required in today's workplace. As a result, the lesson plan will directly involve students in the acquisition of work-specific or career- related skills as experienced by their instructor in the workplace.

SUMMARY

The Educator Externship Program provides an opportunity for teachers to enhance their teaching. Subject matter content can be made more relevant to students by informing them how it applies to the world of work. Teachers must be familiar with the ever-changing workplace and what skills, knowledge, abilities, and attitudes are required for success. The externship program gives the educator a firsthand perspective of new and evolving competencies through a minimum of 50 hours spent at a business or industry. By implementing what they learn from their experiences into their curriculum, teachers can better prepare students for what to expect in the "real world of work."

WORKPLACE LEARNING AS AN INVESTMENT IN HUMAN CAPITAL

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Index: School-Business Relationships, Human Capital, Human Resources Development, On-the-job Learning

Abstract: The paper considers, on the basis of the theory of human capital, in what sense the various agents involved in work-based learning perceive the on-the-job learning period in vocational upper secondary education as an investment-like activity driven by expectations of long-term benefits held by individuals, enterprises and society. The focus of the paper is an empirical survey of Finnish students, teachers, company managers and workplace trainers participated in a work-based learning pilot project. Students believe that their stay in working life improves their employment prospects, enterprises do not incur any additional costs, and workplace trainers and teachers are coping with their changing duties and roles.

INTRODUCTION

The European Union comprises 15 countries representing the Western industrialised nations and the global economy. There are efforts to free up and promote competition in Europe and globally in all sectors of the economy, the aim being, for example, efficient use of resources and increased productivity of work. Increasingly, the relevant criteria are being set, apart from individual states, by such international organisations as the Organisation for Economic Co-Operation and Development (OECD) but also by multinational corporations and their owners, the big investors, the primary beneficiaries of freeing up trade. More and more, states, national economies, enterprises and individuals are being divided, on the basis of how much they are able to enhance their competitiveness, even at each others' expense, into those who are doing well and those who are being marginalised. Enterprises are similarly seeing individuals increasingly in terms of investment: engaging an employee on a permanent basis is profitable only if the short- or long-term benefits clearly exceed the salaries paid to them or other equivalent costs. An individual can raise their value on the labour market by investing in characteristics considered important by employers, in practice by taking high-status qualifications and acquiring work experience.

This description is underpinned by the theory of human capital. According to Asplund (1996), human-related capital covers the individual's all knowledge and skills, whether inborn or acquired, as well as, defined more broadly, also such things as investments linked with the individual's own health and quality of life, that is, everything that affects the individual's participation in productive activity. As its name indicates, human capital has human qualities. In other words, it can increase or diminish, grow old, leave an enterprise, locality or country with its owner. In neoclassical economic theory, capital is something that yields a profit; its value is not determined by production costs or by the amount of societal work that has gone into it but by the amount of profit it brings. Capital is always effective only for a limited period of time, which means that profit must be made in a relatively short term.

The earned income of more highly educated people is substantially higher than that of less educated people (Jäntti, Kirjavainen and Loikkanen, 2000). However, differences between educational attainment alone do not tell us why people with different levels of educational

attainment earn different incomes. The traditional starting point is that the worker's productivity increases with education. Higher education equals higher productivity. In this sense education is an intangible production factor. Education is discussed as an investment of immaterial or intellectual capital. A second explanation for such differences is provided by what is known as the signalling hypothesis, according to which wage differentials reflect social selection. Education is how the worker signals their own abilities to a potential employer. Education requires the same qualities as those demanded by the future employer from their employees, such as talent and perseverance. In other words, education functions as a kind of hiring test but does not necessarily promote productivity or accumulate any intangible capital.

Traditionally human capital has been defined, like other kinds of capital, in terms of the amount of monetary profit yielded when it is invested that is, as the return manifested as higher salaries on the individual level, bigger future profits on the enterprise level, and increased gross national product and enhanced competitiveness on the societal level. Thus, the theory of human capital expands the concept of physical capital to also cover the human means of production (Vaherva & Juva, 1985). However, the human capital that the individual accumulates through education and training also involves other than salary-related effects, such as higher social status, increased mental well-being, increasingly meaningful tasks or access to a more pleasant occupational environment (Asplund 1996; Ertola & Väisänen 1997). Westphalen (1999, p. 10) defines human capital as "knowledge, skills, competencies and other attributes embodied in individuals or groups of individuals acquired during their life and used to produce goods, services or ideas in market circumstances." In this context it is advisable to note that an individual's qualities are in the use of the labour market, but calculating and reporting on human capital is limited to the enterprise level. This paradox is caused by the fact that the acquisition and identification of an individual's knowledge, skills and qualifications are not necessarily only linked with outputs which human capital often refers to. Human capital is considered a concept of economics while the acquisition of knowledge, skills and qualifications are seen as the preserve of education, sociology and psychology. However, human capital cannot be a purely economic phenomenon.

The current vocational education systems in many countries rather emphasizes contextual learning methods than abstract ones. Workplace learning programmes are designed to situate learning in the workplace so as to provide students with contextual, meaningful and relevant use of knowledge. Learning may occur in a community of experienced practitioners in an efforts to situate learning in the context of its utilization. This paper describes the results of a case study on the Finnish experiment of workplace learning in initial vocational education titled *Bridge from Vocational Education to Working Life (2+1 experiment)*.

We propose to describe work-based learning as the individual's, enterprise's and society's human capital investments. We shall draw on four sets of materials from an empirical survey to give preliminary answers to the question of what kind of investment-like features workplace learners, managers of workplaces and workplace trainers, and vocational teachers discern in work-based learning.

WORK-BASED LEARNING AS EDUCATIONAL INVESTMENT

In Finland, arguments for increasing the workplace learning component in education have been based among other things on a desire to increase the efficiency of vocational education and improve students' occupational skill. In addition, research has revealed that skills are acquired more effectively in the context of work than through school-based studying. Educational establishments, enterprises and society all wish to increase the work-based learning component of vocational education and training because formal education has been found to be increasingly out of touch with the everyday reality of the workplace. Teachers may wish to promote work-based learning

because organising it creates new links with enterprises and at the same time provides teachers with opportunities for updating also their own occupational competencies (Kulmala 1998; Lasonen, 1999; 2000). Workplaces offer students authentic, challenging and even conflicting learning situations impossible to imitate at school. Enterprises need to be able to recruit particularly floor-level workers as cheaply as possible but also safely. From the perspective of society it seems important to create, as a kind of automaton of economic growth, a system of lifelong learning with a well-functioning alternation between work and education, and an expansion of work-based learning offers good opportunities for running such a model in.

The oldest form of vocational preparation, the master-and-apprentice system, is probably the best representative of systematic work-based learning or learning on the job, and today apprenticeship training continues the tradition. Naturally, similar (non-formal) work-based learning takes place all the time also as employees perform authentic tasks at the workplace. Even in formal education, work practice has been an important aspect of many vocational qualifications. However, work-based learning is new as a term - in Finland it appeared only in the middle of the 1990s. It refers to goal-directed and supervised studying at a workplace amounting to at least 20 credits(formally equivalent to a week's full-time studies). The aim is that the student will learn a part of the occupational skill required for the vocational qualification in question and of the relevant curriculum objectives at the workplace while also acquiring general readinesses for working life and lifelong learning. Work-based learning is distinguished from earlier work practice not only by the length of the work-based learning period but also by the fact that previously students went to the workplace to practise things that they had learned at school while today they are supposed to learn new things, that is, a part of the contents of their vocational qualification.

RESEARCH PROCEDURES

A consideration of also work-based learning as a form of investment can be justified on the basis of the finding that individuals, enterprises and society as a whole expect their educational activities to yield a return in the long term. As regards enterprises, organising work-based learning placements can be seen as a conscious choice because it is a voluntary one. It is an investment-like decision whose attractiveness, often involving the unpaid contribution of the students, is increased by society's monetary compensation. For students, by contrast, work-based learning periods are an obligatory extension of their education, which means that in their case the "investment decision" is made simultaneously with the decision to apply for or accept a student place. However, the effects of a work-based learning period are not necessarily always positive from the point of view of society, because students can learn at the workplace also many things that are disadvantageous in educational terms.

The empirical surveys discussed below were administered separately to managers of Finnish enterprises providing work-based learning placements, their workplace trainers, and Finnish vocational students and teachers. The materials had been collected by Johanna Lasonen using questionnaires designed for a follow-up of a Finnish vocational education reform pilot project, the Bridge project (the questionnaires were returned as follows: students 435, teachers 110, workplace trainers 217 and managers 247 questionnaires). It is to be noted here that the questionnaire was designed to cover the targets of the Bridge project as a whole, among which the benefits and disadvantages of work-based learning represented only one subtarget (Lasonen, 1999; 2000).

The target groups of the pilot research consist of students, employers, trainers and teachers who responded to the structured questionnaires. The study aimed to survey to what extend the workplace managers, students, trainers and teachers regard students' work-based learning and mentoring as investment for human capital.

RESULTS

The Individual's Perspective on Work-Based Learning. Of the students who answered the questionnaire, a little more boys than girls, a third were under 20 and a third between 20 and 21. Only a good fourth had no earlier education beyond comprehensive school or upper secondary school while the majority had already completed some vocational qualification.

The students were asked why they had taken up studies leading to this particular basic qualification. A good half of them mentioned better employment prospects, nearly the same proportion brought up their interest in the occupational field in question while a good fourth told that they wanted to improve their access to further and higher education. The students thought that their studies had affected their occupational competence, their ability to understand and accept different people, and their employment and career prospects - all obvious individual and societal yields of human capital investments. The strongest negative effects of their education seemed to concern their willingness to set up an enterprise of their own, their financial situation and their ability to find a new occupation as well as their chances of continuing their studies. A poor financial situation is linked with the opportunity costs of human capital investments while the students' reluctance to become entrepreneurs is probably connected with their increased familiarity, though their studies, with the difficult early stages of and the economic risks involved in entrepreneurship.

Among the study fields covered, the most exceptional were social and health services, where the students rated the effect particularly of their studies on their financial status more negatively, but on such things as occupational skill and self-esteem more positively than did the other students, and business and administration, where the students expressed more positive opinions about the effect of their education on such things as their employment prospects and their willingness to set up an enterprise of their own. By contrast, technology and transport students are more pessimistic about their further and higher education prospects and about continued studies in general.

Guidance was also available at the workplaces because only a good tenth of the students mentioned insufficient guidance as a reason for possible difficulties. Most students singled out practical skills and job-specific skills but also social skills and self-confidence as those things that they had learned particularly well. They thought that during their studies they had gained most as regards initiative, practical skills, cooperation skills and self-confidence, least as regards, for example, the skills needed to conduct business in foreign languages and to set up an enterprise of one's own, and writing skills. The students' answers foregrounded practical work experience and improved employment prospects as their best experiences, which thus emerged as the most obvious return to their human capital investment, but some of the respondents also mentioned things related to the social aspects of their training and to learning and personal development.

Managers' Views of Work-Based Learning. The size of an enterprise seemed to be a factor in attitudes towards future provision of work-based learning: managers of enterprises with a turnover of FIM 1-5 million and with a staff of 3-5 people were more sceptical than the other groups about being able to commit themselves to providing work-based learning also in the future, while the biggest enterprises are, naturally, best able to take on new staff in the next few years. Nearly half the enterprises that answered the questionnaire have had, during the preceding year, only 1 workplace learner, while a little less than a third had had 2-3 students and every seventh enterprise 4-6 students. Among the respondents not quite a tenth represented enterprises with 10 workplace learners.

In a battery of statements about the links between education and working life the workplace managers were asked among other things how much workplace learners add to the costs of the

enterprise: the average of the managers' answers is among the lowest in the whole question battery, ranging between "a little" and "very little" and indicating that on average the enterprises incur no additional costs because of workplace learners. Managers of small enterprises of 1-2 people (and, on the other hand, with a turnover of FIM 5-10 million) rated the costs relatively higher but still no higher than "a little". In terms of the enterprises' line of business, only the public sector deviated from this line by rating the costs, on average, even lower. The economic attractiveness of taking on workplace learners is revealed by a question concerning the drawbacks of cooperating with educational establishments: only 2 per cent of all respondents mentioned cost-related things as drawbacks to cooperation linked with work-based learning.

Among the statements included in the question about the links between education and working life, the most positive responses were elicited by the investment-like statements "I am willing to commit myself to provide work-based learning also in the future in my enterprise" and "I wish to develop cooperation with educational establishments and organise students' work-based learning". As for the practical promotion of an improved fit between education and working life, offering students a workplace learning placement and training oneself were the methods mentioned most often by the managers.

The managers assessed the effect of different factors on their selection of new employees on a four-step scale. The averages indicate that the respondents lay the greatest stress on the employee's positive attitude and initiative and on their personal qualities in general. They pay least attention to the job applicant's sex and language skills and their possession of an extended qualification. As regards the distinct broader components of human capital included in the list, on average the managers considered previous work experience fairly important, as they did the possession of a relevant vocational qualification. Relatively speaking, an applicant's previous work experience seems to have the play greatest role in the recruitment decisions of middle-sized SMEs.

The respondents were asked to assess, on a similarly four-step scale, how important a number of general qualities required in working life were in jobs in their field. As in the previous question concerning the qualities influencing their selection of new employees, the managers considered a positive attitude and initiative but also cooperation skills and practical field-specific skills the most important qualities. It appears that the respondents' workplaces need least the skills required to conduct business in foreign languages, writing skills, a knowledge and skills base for further and higher studies, and obedience. When the respondents were asked to pick from the list the three qualities that they considered most important, a majority singled out practical field-specific skills as the most important qualities, with cooperation skills and a positive attitude placed as second and third respectively. Initiative and an ability to solve problems on one's own also gained a relatively great deal of support as the second most important quality. Both small and big enterprises were comparatively unanimous about the importance of the different qualities in jobs in their field.

The managers and the students were asked about the skills and qualities needed in working life on the one hand and provided by the students' education on the other. A comparison of their answers suggests a fairly good fit between education and working life even if the managers consider that working life needs even more of most of the qualities provided by the students' education, except for writing skills. The relatively smallest differences between the skills needed in working life and the skills provided by the students' education are found in the ability to use information sources and in mastery of the knowledge and theoretical base of the given occupation, the greatest in initiative, independent thinking skills and life management.

Altogether, the answers lead to the conclusion that large industrial enterprises in particular see educational cooperation and provision of work-based learning placements as a way to ensure the future availability of competent personnel, naturally an important factor from the point of view of the enterprise's productivity and its ability to achieve its future targets.

The Perspective of the Workplace Trainers. The workplace trainers were asked about the personal disadvantages involved in the supervision of work-based learning. Nearly a third of those who took part in the survey thought that there have been no disadvantages, but on the other hand a third considered the additional work and responsibility linked with supervision as a disadvantage and a good fifth mentioned also being pressed for time. When they were asked about the benefits of cooperation with the educational establishments, the workplace trainers mentioned most often the broadening of their own perspective and acquiring new information about today's education or about other things, while those trainers who mentioned access to labour and the student's contribution as the relevant benefits clearly represented the enterprise's point of view. As for the benefits from cooperation with teachers, those mentioned most often by the workplace trainers were acquiring information about the students or about the expectations of the educational establishment and discussions with the teacher. Every sixth trainer claimed that there has been no collaboration at all or that it had brought no benefits.

The respondents were also asked about their readiness to commit themselves to serve as workplace trainers. A fifth are either unwilling to make such a commitment or have not decided yet, while a majority (50%) of those who expressed willingness to continue as workplace trainers said that they were ready to commit themselves for at least a few years or for an indefinite period.

The workplace trainers considered that the students learn to work relatively independently in a month at most or depending on the student or task. The trainers' answers suggest that the work-based learning experiment had had a positive effect on developing the enterprises' operations, clarifying their targets and finding new ideas. Only a good fifth of them answered that the experiment has not had much effect while a little less than a tenth did not know.

The Perspective of the Vocational Teachers. Nearly six out of ten of the vocational teachers who answered the questionnaire were women. They have mainly upper college-level and university-level qualifications and many of them had, in addition, long work experience from working life (only some every tenth had no such experience). Half the respondents have taken part also in workplace trainer training.

Work-based learning has meant that there are now new elements in the teacher's work that have broadened its scope and enriched it by requiring the teachers to develop professionally as regards both pedagogic and cooperation skills. Despite reduced teaching hours, the teachers' overall workload seems to have increased. The new challenges and greater variety involved in their work stem from new learning and teaching environments and more individualised curricula. Work-based learning requires the teachers to invest particularly their free hours, but as benefits may be considered many things that are making their work more varied. According to the teachers' answers, the benefits gained by the educational establishment from work-based learning include, apart from partners and help in planning, also an incentive to rationalise their operations and focus on their own strengths or the foundations of acquiring occupational skill.

When the teachers were asked about the targets that they set for their students' work-based learning, they mentioned most often the student's finding a job and/or establishing relations with employers, learning their occupation, increased work experience, learning new things, acquiring working-life skills, learning customer service, receiving a salary, becoming independent, internalising the role of an employee and doing good in their studies. Benefits from work-based learning mentioned most often by the teachers included networking and the improved employment prospects it brought, increased work experience and occupational skill, the function of the work-based learning period as a probationary period during which the employer can try out a possible new employee, the student's own opportunity to find out whether the occupation suits them, and the chance that both parties have to get to know each other. The teachers think that work-based learning

promotes various working-life skills (such as cooperation, social and communication skills), practical occupational skills, independence, easier transition to working life, mastering comprehensive wholes, the growth of a sense of responsibility, learning and applying what one has learnt, and problem-solving skills. The qualities developed by work-based learning most often mentioned by the teachers were initiative, practical skills, cooperation skills and self-confidence.

There was a great deal of overlap between the qualities that the enterprise managers mentioned most frequently as those most important in jobs in their field and the skills brought up by the teachers and the students.

Cooperation between educational establishments and enterprises offering work-based learning placements is not new as such, and both the teachers and the workplace trainers consider that it already works fairly well. Naturally, increased efforts to develop collaboration on work-based learning and to disseminate relevant information presupposes increased time and other resources, that is, increased human capital investments both from society and enterprises.

SUMMARY

Despite a good half of the students reporting that they were studying to improve their employment prospects, the students' overall expectations concerning the return of their investment in education were as expected because finding one's study field interesting was nearly as important a reason for undertaking studies towards the given qualification as was finding oneself a job. The studies were perceived to have a positive effect on occupational skill, understanding and accepting different kinds of people, and employment and career prospects, things that are, simultaneously, obvious individual and societal returns of a human capital investment. By contrast, education had a less positive effect on the students' willingness to set up an enterprise of their own and on their financial situation. The students who had taken part in the work-based learning experiment felt that they had, through work-based learning, acquired many skills of a kind considered also by the enterprises as the most important preconditions of successfully performing the tasks in their field and as the most important criteria used by them in selecting new employees.

While the workplaces provided an opportunity to learn situation-specific dimensions of the work by experience, the educational establishments enabled the students to gain a broader understanding of their future occupation. The workplaces were considered the best places for learning sociability, gaining an overall grasp of various aspects of the occupation, learning to think and learning the customs and rules of the work community.

In the eyes of the managers of the enterprises offering, in the Bridge experiment, work-based learning placements to students of vocational upper secondary education establishments, a positive attitude and initiative and personal qualities in general are, among the subsectors of human capital, more important recruitment criteria than, for example, education and work experience. The managers' answers suggest that these qualities, related to proper attitudes towards work and to cooperation skills, are - in addition to practical occupational skills - those most needed also in tasks in the respondents' line of business. By contrast, foreign language and writing skills (often considered important by educational establishments) are rated as the least important qualities.

The managers' answers to the questionnaire suggest that work-based learning is seen in enterprises as a longer-term investment even if managers of enterprises of different sizes and representing different lines of business do not, naturally enough, in all respects agree on its benefits or profitability. Particularly in a short term, promoting the enterprise's productivity is not among the most important functions of work-based learning, but work-based learning is considered a suitable method of, for example, developing cooperation with educational establishments and of orienting new employees.

Large industrial enterprises benefit from work-based learning primarily in the form of easier recruitment while the owner-entrepreneurs of small enterprises and the self-employed gain also new ideas and partners. The size or line of business as such of an enterprise do not seem to affect its ability to organise work-based learning, but as also earlier research has shown, in smaller enterprises it is more difficult to provide workplace learners with a supervisor trained for the task. On the other hand, the smaller enterprises often operate in fields where tasks can be more varied and comprehensive than those that workplace learners are offered in, for example, enterprises engaged in industrial production.

The survey among the workplace trainers reveals that supervising students increases somewhat the workload and responsibilities of the employees who become trainers, while gaining new knowledge and new perspectives are the things most often mentioned by them as the benefits of their new task.

The teacher survey suggests that work-based learning has meant that the teacher's work now has new elements that have broadened its scope and enriched it by requiring the teachers to develop professionally particularly as regards pedagogic and cooperation skills. There have been some changes in the role of the vocational teacher, and despite reduced teaching hours the teachers' overall workload seems to have increased. At the same time, a better fit between education and working life has enabled also educational establishments to rationalise their operations and to approach their tasks in an more systematic manner.

It can be observed by way of a summary that all the parties covered by the survey consider that work-based learning achieves quite a good fit between education and working life. Considering work-based learning from the perspective of investment showed that on average the students believe that they are acquiring skills essential for entry to working life and improving their employment prospects, that the enterprises incur no additional costs because of taking on workplace learners, that the workplace trainers do not see their supervisory duties as too much of a distraction from their main job, and that even the teachers are mainly satisfied with the changes that have taken place in their work. However, on the reverse of this overall picture we find the fact that the students are not given enough guidance, that unpaid work does not motivate, that in small enterprises unreasonable amounts of time are sometimes spent on orienting and guiding the student, that a workplace trainer may be reluctant to guide the students or lack the requisite skills, that the teachers' workload has increased and that they are constantly pressed for time and suffer, as a result, from feelings of inadequacy. On the other hand again, when the requirements of working life change rapidly in some fields, work-based training is one of the best methods of preparing young people, particularly those at risk of unemployment, successfully for an occupation.

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SUPPORTING LIFELONG LEARNING
THE NEW INTEGRATED SCOTTISH QUALIFICATIONS SYSTEM

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Index: Lifelong learning, Vocational Qualifications, Outcome-based units; National Qualifications Framework; Scottish Qualifications Certificate

Abstract: The new National Qualifications system in Scotland represents the coming together of the previous academic and vocational qualifications systems in schools and colleges. The new qualifications are based on a single curriculum, assessment, quality assurance and certification system covering all subjects from Chemistry to Care and English to Engineering. The new modular qualifications are built up of outcome-based units.

The launch of the new qualifications has been accompanied by the launch of the Scottish Qualifications Certificate. This is a cumulative, computer-based certificate which will show success in every unit and programme which a learner achieves.

INTRODUCTION

In the summer of 2000, in the very week of this important IVETA conference, a very significant event will take place in Scotland. The first large-scale issue of a new kind of certificate will take place to recognise students' success in the new National Qualifications in Scotland.

Before continuing to describe this system, it may be useful to draw your attention to Appendix 1 which contains definitions of some of the general terms used in this paper since there can be considerable variation in definition of terminology between countries operating qualifications systems.

New National Qualifications

The significance of our new National Qualifications for the theme of the IVETA conference arises in three ways.

Firstly, the new National Qualifications system in Scotland represents the coming together of the previous academic and vocational qualifications systems in schools and colleges.

The reform is based on a system that has been developing since the early 1980's aimed at raising the quality and quantity of education and training provision. The model has the following characteristics. It is:

- Coherent – providing clear progression routes between qualifications by the development of an integrated national framework of qualifications
- Responsive – the modular (also called 'unitised') approach ensures the content of the learning is relatively quick and easy to adapt to changing needs
- Interactive – allowing for more learner-centred approaches to learning including distance and IT-based learning

- Flexible – allowing flexibility of entry to qualifications and flexibility with pace and place of learning
- Credit-based – providing credit for prior learning and for partial success by certification of individual units
- Open and fair – the standards required for success in a qualification are specified in advance and available publicly
- Focused on positive achievement – the assessment focuses on what a learner can do

The new National Qualifications have been developed to meet the needs of increasing numbers of young people who are staying on in education and training beyond the compulsory school leaving age of 16. Therefore new subjects and new levels have been introduced so that everyone has relevant and challenging, but achievable. courses available to them. The new qualifications are based on a single curriculum, assessment, quality assurance and certification system covering all subjects from Chemistry to Care and English to Engineering. One of the main aims of the new system is to ensure that achievement in vocational and academic subjects has equal value in the eyes of parents, students, further and higher education institutions, and employers.

The new qualifications are built up of outcome-based units which can be studied free-standing or can be combined into certificated programmes. Additional flexibility is built into the system by having design rules that identify selection from a range of optional units in addition to the required compulsory units.

The units provide the publicly available standards against which the students are assessed. We have tried in our new qualifications to combine the advantages of internal and external assessment to ensure a valid, reliable and credible national system. Units are assessed internally by the teacher or lecturer and are not graded. Assessments can be taken when the learner is ready. To ensure that internal assessments achieve the consistent application of national standards, we have developed a national bank of assessment instruments that are available to centres on CD-Rom. On successful completion of a course learners must pass an external assessment that may be an examination or, for vocational subjects, may be a practical project or performance. This external assessment requires the learner to integrate knowledge, understanding and skills from the units that make up the course. This external assessment is devised and marked by SQA and is graded.

There are no age limits or entry requirements for the new qualifications – and their modular nature and wide-ranging catalogue of units means that they can meet all learners' needs. They are designed to link to the more advanced qualifications of colleges and universities and to the qualifications designed to test full employment competence. There are also qualifications within the national qualifications framework for those with learning difficulties. A diagram illustrating the SQA framework of qualifications and how they link to university degrees is provided in Appendix 2 of this paper.

One of the features of the new National Qualifications is their emphasis on 'core skills' – those key competences required by individuals to function effectively in personal, vocational and occupational contexts and as lifelong learners. The skills that have been identified in Scotland as critical for personal development and performance are: communication, numeracy, problem solving, information technology, and working with others. Standards for these core skills have been developed at each of 5 levels of the new National Qualifications system.

The second link with the theme of the Conference is that the launch of the new qualifications has been accompanied by the launch of the Scottish Qualifications Certificate. This is a cumulative, computer-based national certificate produced by SQA which shows success in every unit and programme which a learner achieves. It grows as the learner adds new successes year-by-year and

includes automatic calculation of achievement when the learner has entered for programmes of units (such as diplomas). Success in a programme is also recognised by the issue of a special commemorative certificate. The Scottish Qualifications Certificate is, in effect, a lifelong learning record of success in all the qualifications in the Scottish Qualifications Authority portfolio. The importance of core skills is demonstrated by their being listed separately on the Scottish Qualifications Certificate.

Thirdly, the new qualifications system and the new certificate are being developed to extend ways in which successfully-completed learning can be rewarded. This is responsive to the government's ' inclusion' policy that aims to encourage the disadvantaged back into learning. Initiatives include recognition for smaller "chunks" of learning and quality assessment by SQA of non-certificated training. New link-ups with other organisations such as the broadcasting media are being developed to encourage people to come back into learning and to aim for the achievement of qualifications. A recent example was a link with the BBC to promote the use of the Internet through television programmes and an interactive training CD-Rom.

As another element of flexibility, more responsive forms of assessment, including on-line assessment, are being explored so that assessment is available where and when the learner is ready for it. These are being developed alongside all the exciting developments in on-line teaching and learning. In the next few years we will move increasingly to ICT-based assessments that will be better targeted to individuals and be less time-consuming because they will be adaptive. The system will use the full range of possibilities which smart software and web-based resources offer. This should take us well beyond the computer-based standardised testing that has been used for some years. We are developing ICT-based assessment banks and can envisage the development of software smart enough to vary the values and contexts in standardised types of questions. However, assessment of performance evidence may be slower to be absorbed into the ICT system. Although the use of internet-based video-conferencing can link the assessor and learner who are geographically apart, the challenge is to ensure that we have dealt effectively with the authenticity and security issues. This is critical if we are to retain confidence in the assessment results.

CONCLUSION

We have been actively involved in the reform game for twenty years and we still have many challenges to face. The opportunity to share ideas and experiences at this prestigious international conference is invaluable in shaping ideas for the way ahead.

APPENDIX 1

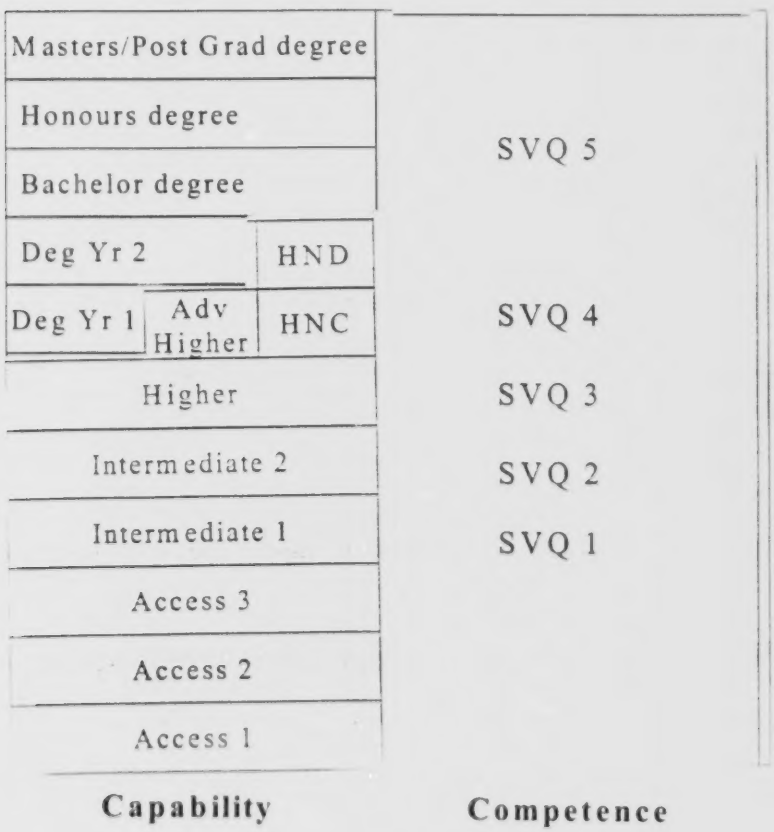
Definition of Terms

Standard	a set of information which forms the basis of an assessment judgement
Unit or module	a self-standing group of related skills and knowledge – standards - against which an assessment judgement will be made
Qualification	a set of standards which form a package of achievement worthy of formal recognition in a certificate
Learner	any individual engaged in learning, whether in a school, college, university, training organisation, home, workplace or through open, distance or technology-based approaches

Assessment	the process of comparing evidence produced by a learner against a standard
Centre	the organisation responsible for the assessment of the learner's achievements against the standards. Centres can be schools, colleges, universities, training organisations, skills-testing services, workplaces and other appropriate organisations

APPENDIX 2

Scottish Credit and Qualifications Framework



SCOTTISH QUALIFICATIONS AUTHORITY

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KEY POLICY ISSUES IN THE PROMOTION OF INFORMATION TECHNOLOGY IN VOCATIONAL EDUCATION: SOME LESSONS FROM THE FIVE-YEAR STRATEGY IN HONG KONG

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Index: Information Technology, Policy Evaluation, Vocational Education

Abstract: In this information era, the promotion of information technology (IT) in education has become an important agenda for governments all over the world. In June 1998, the Hong Kong Government of the Special Administrative Region (HKSAR) published a policy document entitled "Information Technology for Quality Education: Five-Year Strategy 1998/99 to 2002/03" as a blueprint for the promotion of IT in education. Despite the commitment and financial support provided by the HKSAR government, several problems have been identified in the policy plan and in fact, have emerged in the course of its implementation. This paper applies four key policy evaluation categories – namely, technical feasibility, political viability, financial feasibility and administrative operability to suggest ways for improvement and to explain their relevance in promoting IT in vocational education.

INTRODUCTION

In his maiden Policy Address to the Legislative Council in October 1997, the Chief Executive of the Hong Kong Special Administrative Region announced the launching of a five-year strategy to promote the use of information technology (IT) to enhance teaching and learning. In view of the extensive nature and the large amount of resources that have been promised to achieve the plan, it is important that the preconditions for effective implementation have been sufficiently considered. However, since the policy strategy was launched, several problems have emerged that undermine the goals and effectiveness of the strategy. This paper aims to make a critical evaluation of the Five-Year Strategy through a policy analysis perspective and a comparative approach that focus on relevance of objectives and implementation issues to provide insights on promoting IT in vocational education. The four essential evaluation criteria in policy analysis are namely: technical feasibility, political viability, financial feasibility and administrative operability. Through the application of these four evaluation criteria, some practical suggestions are made with regard to the planning and implementation of strategies in promoting IT to bring about desired learning outcomes.

PROMOTING INFORMATION TECHNOLOGY IN EDUCATION

There has been an exponential growth in the use of communication and information technology in the past decade or so. But Hong Kong has lagged behind other advanced countries in developing a coherent policy in response to the technology revolution. In recognition of its tremendous impact on people's daily lives and the need to catch up with other advanced countries, the Chief Executive stated in his first Policy Address of 1997 that Hong Kong 'should aspire to be a leader, not a follower in the information world of tomorrow'. Since education plays a key part in the pursuit of this important goal, he has pledged to formulate a five-year strategy for the application of IT in

promoting the effectiveness of teaching and learning. In June 1998, a formal document entitled 'Information Technology for Quality Education: Five-Year Strategy 1998/99 to 2002/03' (hereafter called the Five-Year Strategy) was published as a blueprint for the collaboration among the Government and various key players. Before the issuance of the Five-Year Strategy, the Education and Manpower Bureau has only taken piece-meal measures in providing IT exposure for students and teachers.

In the Five-Year Strategy, a vision has been set 'to harness the power of IT to help our students get the most out of school education'. To support this vision, three strategic objectives have been identified. The first objective is to arouse and maintain students' motivation to learn through the use of IT. The second objective is to broaden students' horizons, so as to enrich their learning experience and facilitate the development of a creative mind which are essential to enable students to be adaptive to changes in this global age. The third objective is to encourage independent lifelong learning and instill team spirit among students (Five-Year Strategy, 1998: para. 2). To achieve these objectives, four missions have been listed for the five-year period. They include helping teachers to settle in their new role as a 'facilitator', incorporating IT elements in the school curriculum, progressively enhancing the provision of IT facilities and educational software for schools, and building up a network infrastructure to facilitate sharing of educational resources (para. 6).

In corollary, there are four key components in the Five-Year Strategy: teacher enablement, curriculum and software, hardware provision, and network infrastructure. Teacher enablement has been identified as the most important component in the Strategy since teachers' willingness and ability to teach through IT will directly affect the successful implementation of the goals set. As for implementation, the Five-Year Plan stipulated the setting up of an advisory committee comprising representatives from the Government, the school sector, tertiary sector and IT industry to provide a steer for the Strategy and to oversee its implementation. It has been specifically mentioned that the Strategy is not meant to be implemented in a top-down manner, but schools are expected to formulate their own IT plans tailoring to their specific needs. The Plan also proposes setting attaining targets for students at key learning stages at both Primary and Secondary levels.

Although the Five-Year Strategy only applies to basic education and secondary technical schools, it has an important role to equip secondary school leavers with the essential knowledge and competence for more advanced training at vocational and tertiary levels. Technical and vocational training provides an alternative route to school leavers who may not be able to proceed to mainstream higher education programmes. In fact, it serves to train manpower for the economy at craft, technician and higher technician levels. Since technical training and vocational education occur in a number of modes and are offered by various institutions, it is less appropriate to adopt a uniform approach in promoting IT in all their courses. Nonetheless, for the Hong Kong Institute of Vocational Education (IVE) which is publicly funded and is the main provider of courses from basic craft to higher diploma level, it can draw on the experience from the Five-Year Strategy to develop a more cost-effective and practical approach to enhance its training.

FROM POLICY TO IMPLEMENTATION

Taken at face value, the Five-Year Strategy seems to be both comprehensive and attentive to relevant issues concerning the adoption of IT in education. However, as often shown by experience both locally and overseas, even the most meticulous and well-intended policy may not always be implemented as planned nor bring the desired outcomes. To ensure that the identified goals of a plan or policy can be attained, it is essential that evaluation criteria be developed for objectives set and that possible constraints on implementation be anticipated. Numerous authors (Bardach, 1972;

Quade 1975; Dunn, 1981; MacRae and Wilde 1985) have suggested categories of evaluation criteria in policy analysis and planning. The more commonly applied ones can be grouped into four broad categories: technical feasibility, political viability, financial feasibility or possibility, and administrative operability (Patton and Sawicki, 1993: 207). These categories can be briefly described as follows:

- ***Technical feasibility*** includes criteria that measure policy outcomes to see if they achieve their purpose. They address the basic question of whether the proposed action or strategy will work in a technical and practical sense. The two principal criteria under this category are *effectiveness* and *adequacy*. The criterion of effectiveness focuses on whether the proposed policy will have its intended effect; whereas adequacy measures how far toward a solution or stated objective we can proceed with resources available.
- ***Political viability*** is mainly concerned with the impact of policy outcomes on relevant power groups such as decision-makers, legislators, administrators and any affected groups. The central question is whether one or more policy alternatives will be acceptable or can be made acceptable to the relevant groups. The criteria that assess or measure political viability are often subjective and less quantifiable. The common criteria used include *acceptability* to relevant actors, *appropriateness* of policy in meshing with values of society, *equity* in terms of impact, and *responsiveness* in meeting the needs of target groups.
- ***Financial feasibility*** focuses on availability of funding, and considerations of costs and benefits of a policy or programme. Since any new policy will require extra resources and has fiscal implications, policy-makers must be able to justify the incurred cost and explain how proposed actions can benefit the relevant client groups or society in order to obtain support from funding authorities. In evaluating financial feasibility, there is a tendency to rely on 'hard' quantitative measures, but often the less easily monetarizable aspects also have bearing on the desirability and value of a proposed policy or programme.
- ***Administrative operability*** assesses how possible it is to actually implement the proposed policy within the political, social and, most important, administrative context. They are concerned with whether required expertise and staffing are available, whether employees will cooperate in delivering the service, and whether the necessary physical facilities are there. The common criteria to consider in evaluating administrative operability include authority, institutional commitment, staff capability, and organizational support.

These four categories in evaluating policy are inter-related and have relevance for each other. They are useful in anticipating possible constraints at the implementation stage and in assessing the appropriateness of proposed actions in meeting set objectives. In fact a comparative study by Pelgrum and Plomp (1993) on "Computers in Education in 21 Education Systems" of which the set of indicators used such as hardware availability, software availability, type of use, relevance and training etc. can also be classified under the four broad categories of policy evaluation. They are used as the analytical framework in the following section to assess the efficacy and possible limitations of the Five-Year Strategy, as well as their implications on promoting IT in vocational education.

LESSONS FROM THE FIVE-YEAR STRATEGY

(a) Technical Feasibility - Although the Strategy has not yet been fully implemented, an assessment of its *effectiveness* can be partly based on the experience of other countries that have adopted IT in education and partly based on the relevance of proposed measures in meeting the objectives. As found in Pelgrum and Plomp's study (1993), hardware availability, software

availability, organizational and infrastructural support, and training are necessary for the introduction of IT in education. With reference to the three set objectives in the Five-Year Strategy, the proposed measures under the four key components such as the provision of training to teachers, IT equipment and development of educational software etc. seem to provide the essential conditions to facilitate their effective fulfillment.

However, since 'effectiveness' is concerned with whether the proposed policy will have its intended effect, many of the proposed measures only provide the necessary, but not sufficient conditions to achieve the stated objectives. This is particularly so when some of the objectives are less straightforward, and that the policy effects are longer-term and indirect. As pointed out by Roblyer et. al. (1997) and Selwyn (1998), there is a lack of hard evidence on effectiveness of IT in facilitating students' achievement and bringing desired learning outcomes. The difficulty in assessing effectiveness is further complicated by the ambivalent nature of policy objectives in the Strategy. Given the many different rationales that can be presented for introducing IT in education, it seems that the Strategy has not clearly spelt out the priority between the pedagogical function and other goals of IT[1]. Its three stated objectives seem to imply that IT is inherently beneficial and is the panacea to improve education.

Although the goals of vocational education appear to be more specific in terms of providing practical pre-employment training, the incorporation of IT in teaching and learning equally involves a 'paradigm shift' from a teacher-centered approach to a more interactive and learner-centred approach. Teachers would need to play a guiding role in cultivating students' proper attitude and constructive approach towards the use of IT. In policies relating to education, human and behavioural aspects are crucial to put its intended goals into effect. More attention should be given to the user context (i.e. motivations, intentions and advantages called into play by use of technology) and cultural context (i.e. norms and values of society) of technological implementation.

(b) Political Viability - Notwithstanding the general consensus on the importance of IT in the current knowledge society and acceptance of the functions of IT in education, different sectors of the community have quite diverse views towards the Five-Year Strategy. Since the policy was initiated by the Chief Executive, it has gained wide support from both legislators, executive councillors and members of the Education Commission. However for some educational coalitions such as the Professional Teachers' Union, they are critical of the Strategy and its proposed measures despite their acceptance of the policy in principle. The major criticism of these groups is that the Strategy does not have a long-term vision and fails to give sufficient thoughts on the overall direction, objectives and institutional framework for its implementation. It is also skeptical of whether the large amount of resources allocated and to be spent within a set timeframe could be used in an efficient and cost-effective manner (Wen Wei Po, 10 September 1998).

Although school heads and teachers generally accept that the promotion of IT in education as appropriate in meeting the needs and prevalent values of society, their readiness to implement the proposed measures varied considerably due to the heterogeneity of teachers, the large number and diversity of government-funded schools. Similar to the evaluation by Bigum and Kenway (1998) of the main standpoints that educators take towards new technologies in education, there are what they called 'boosters' and 'critics' amongst Hong Kong teachers. Despite the variations in terms of acceptability amongst teachers, they are more unanimous in their general perception towards the low 'responsiveness' of the Strategy. According to the media reports and surveys conducted by various organizations, it is noted that quite a number of them regarded the Strategy as not responsive enough in catering for their psychological needs and concerns in adjustment. Furthermore, the flexibility allowed in the delivery of computers and related equipment to match

[1] Pelgrum and Plomp (1993) quoted Hawkridge's (1990) summarization of four rationales for introducing IT in education: social, vocational, pedagogical and catalytic (to accelerate other educational innovations).

the particular circumstances of schools casts doubt on the 'equity' criterion. Usually the 'better-off' schools will have a comparative advantage in getting other technical support and training places for teachers. Another concern relating to equity is the observation supported by research that students from wealthier families are more likely to have computers and other technology resources at home than those from poorer families (Roblyer et. al., 1997: 43). The discrepancy in educational advantages and disadvantages of students from different socio-economic background may be aggravated with the growing use of IT and its integration into the curriculum.

(c) Financial Feasibility - Since the Strategy has been able to meet the two important criteria of 'appropriateness' and 'acceptability' in the political viability test, it can readily secure the necessary funding from the government. The implementation of the Five-Year Plan involves a capital cost of $2,580 million and a recurrent cost of $233 million per year. An annual recurrent grant ranging from $69,000 to $76,000 is also provided to schools depending on their size for the purchase of consumables, educational software packages and other ancillary items. Although the current allocated funding seems to be sufficient to provide a 'threshold level' of hardware to schools, training for teachers and the necessary infrastructural support, it is doubtful whether schools have the financial capacity to maintain and update software and IT facilities. In view of the fact that the present estimated required funding is mainly based on the quantifiable aspects while the less measurable components have not been adequately dealt with in the Strategy, there are concerns as to whether future financial support will be as sufficient and as readily available. To implement IT in education, it is always difficult to assess how much funding would be adequate given its expensive and fast-changing nature, and the need for maintenance.

(d) Administrative Operability – In the case of the Five-Year Strategy, the capability of existing administrative and delivery systems has facilitated its smooth implementation. There is clear authority for the Education Department to request co-operation from schools and teachers, and resources to procure equipment and recruit technical staff. In terms of institutional commitment, it is relatively straightforward for officials of Education Department to discharge their assigned tasks and to make the necessary provisions as laid down in the Strategy. But for schools heads and teachers, their commitment may be less certain since the policy requires fundamental changes in their behaviour and working style. Apart from the provision of training, to facilitate commitment and willingness of teachers in using IT would require other supporting conditions such as exposure of teachers to the potential functions and benefits of IT, availability of local educational software, technical support, including time and resources for preparation of teaching material. With regard to organizational support, the educational authorities have not provided sufficient assistance to schools in dealing with problems of insufficient space and installation difficulties due to constraints in physical setting.

CONCLUSION AND RECOMMENDATION

From the evaluation of the Five-Year Strategy, it can be seen that an effective policy to promote IT in education requires several conditions to meet the four sets of evaluative criteria. Although it is recognized that IT has a growing importance in the present rapidly changing world and knowledge society, we should be cautious of a blind faith that IT can necessarily serve our education needs better. Since education involves human interaction and even vocational education is increasingly expected to train personnel or technicians with multi-skills, more attention should be given to the human and cultural dimensions in applying IT in education. What can be learned from the Five-Year Strategy is that policy makers need to have a clear understanding of the user context to develop their learning faculties, the underlying rationale for integrating IT into the curriculum, as well as the personal and professional needs of teachers. In addition, they also need to be sensitive

to the organizational and institutional culture of agencies responsible for implementing IT in education, and the specific nature and requirements of different vocational training programmes.

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Wen Wei Po, 10 September 1998.

VOCATIONAL EDUCATION AND TRAINING FOR OPERATORS OF MODERN ENTERPRISES

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Index: Vocational Education, Curriculum Development, On Job Training

Abstract: The idea of how to run an effective and efficient vocational education and training system (**EEVETS**) with enterprises is given in this paper. It includes curriculum, teaching method, teaching support, quality control and management, etc. The keys to form **EEVETS** are demand analysis, motivation mechanism, teachers and tutors, quality control and service support. The training system for modern power station operators is briefly given as an example.

INTRODUCTION

As the great and continuous progress of science and technology, the level of equipment of modern enterprises becomes higher and higher. The renewal period of equipment is going shorter and shorter. The damage of accident becomes much serious in huge operating system in modern enterprises. The requirement for operators' ability is much higher nowadays. By analyzing the details of accidents and the situation of the staff (especially the operators) of North China Power Group (**NCPG**), an **EEVETS** for operators is designed and performed. The **EEVETS** has been running three years. More then 200 operators of **NCPG** have been trained for running large power generation system (300MW or larger power generation system). Also, the **EEVETS** is used for other staff as the requirements of enterprises. More then 5000 persons have been trained per year in our college.

DEMAND ANALYSIS FOR EEVETS

The first important thing to construct an **EEVETS** is demand analysis. Several serious accidents happened in 1997 in **NCPG**. As the result of accident investigation, the quality of operators is a concerned focus. The committee of production security of **NCPG** determined that all operators must be well trained for operating the modern power generation system. Beijing Electric Power College (**BEPC**) was appointed for the task. **BEPC**, operation department of **NCPG** and human resource department of **NCPG** organized an investigating project which consists of two aspects: analysis and professional test of staff members. The results are as following:

The academic level of staff is showed as Fig.1. This is one result of analysis of staff members of **NCPG** Company. Here it shows the average academic level is low. There is a great urgent need to add their knowledge both in basic and special courses.

The result of professional test is showed as Fig.2. It indicates their technique and skills are to be improved and operating knowledge as well.

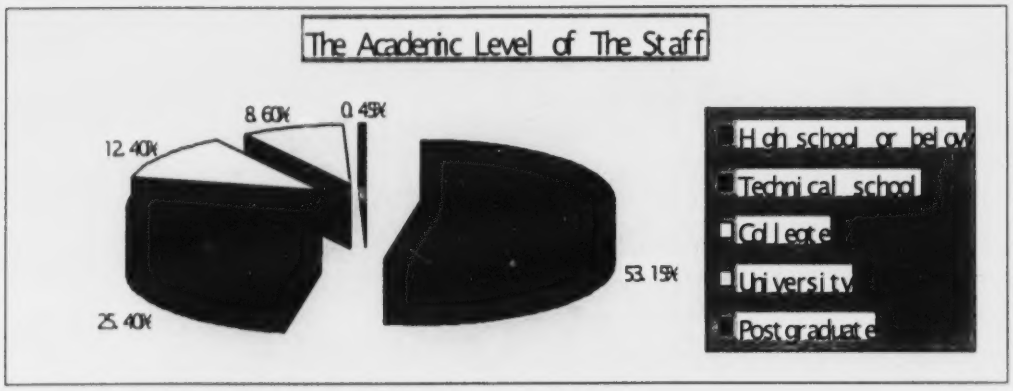

Fig.1 Investigation Result of The Academic Level

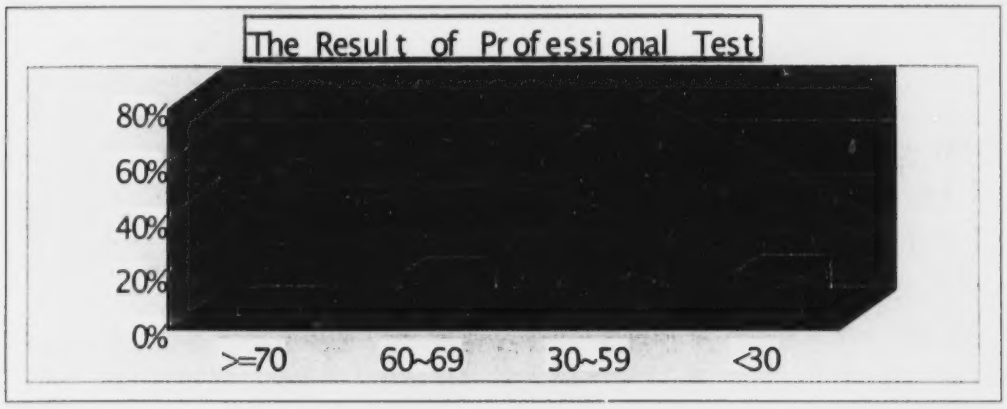

Fig.2 Result of Professional Test (Without Preparation)

Through demand analysis, three aspects of key knowledge are drawn out. They are systematical frame knowledge of running system, special knowledge of normal operation and special knowledge of breaking down accidents. And, the way to strengthen operators' ability of knowledge application is also designed in training system. Training on simulator is an effective way to improve operators' ability highly.

MOTIVATION MECHANISM IN EEFVETS

The second important thing to construct an **EEVETS** is to construct a motivation mechanism for operators' knowledge renewal. A human resource development strategy is settled in enterprise firstly. The purpose of it is to motivate the staff members, managers, in-plant educational departments and vocational education organizations. Following the strategy, an on-job training system is settled with operation system. Each operator is regularly evaluated according to the criterion set by national organization, enterprises association or enterprises itself. Operators can take on operation with a professional license. Those who have not passed will be laid off and they have to get trained until they

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pass the training and evaluation. The professional license should be renewed in a certain period of time.

The scholarship is awarded according to the performance. This is also a part of motivation mechanism for operators' knowledge renewal. The vocational education and training organization spread the scholarship to the trainees according to two items: one is scores and the other is a behavior in obeying regulations and partnership with others. The fund of the scholarship is provided by enterprises.

TEACHERS AND TUTORS IN EEVETS

The third important thing to construct an **EEVETS** is a network of high-level teachers and tutors. As we know the feature of power system is technology-centered and integrated, in which large capacity and high parameters generating units are adopted. So it brings about deeper and higher demand for education and training than conventional colleges education and in-plant training. From this point of view we combined the professors in colleges, senior engineers and experienced operators in enterprises into a group that is organized as a dynamic net. Its members are much experienced in education, training and practice and come from all units in north China from decision-making level, management level to operational level.

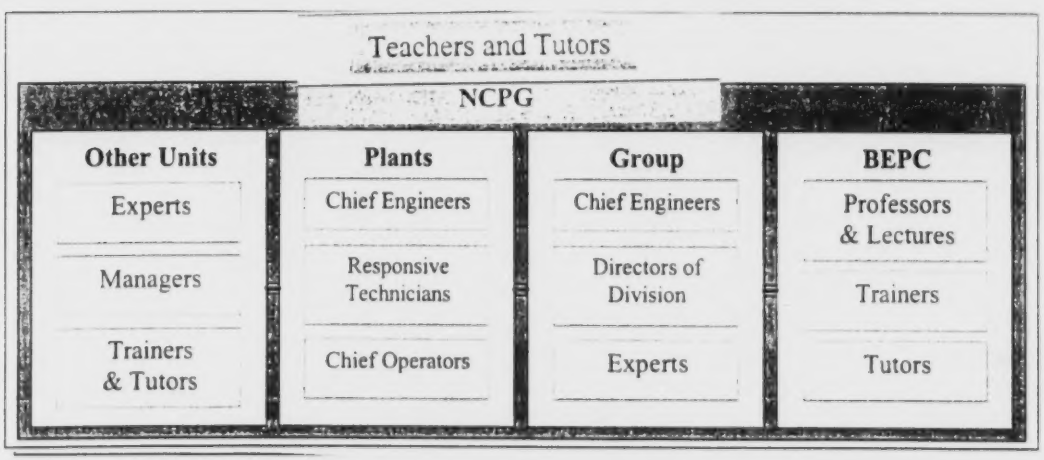

Fig.3 The Network of Teachers and Tutors

The program and syllabus is made by them and suitable curriculum is developed according to the demand analysis. Preparation of the teaching materials is very complicated and needs a great deal of knowledge and experience. The teaching materials are prepared by them.

Simulator-related training is an important part of the training, which accounts for nearly a half of program. The trainers have been trained and got the licenses to take the job.

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QUALITY CONTROL IN EEVETS

The fourth important thing to construct an **EEVETS** is quality control. It includes a strict examination system, a thesis tutor system and a committee of evaluation.

Three phases are set during the program. The first one concerns about technical basis; the schedule focuses on basic courses on electrical, thermal and automation technology. The exams are about knowledge. The second one focuses on the operating system which consists of frame knowledge of operating system, special knowledge and application. The exams are about application and analysis of the knowledge. The third one is on the simulator in which the start-up and shutdown of the generating units are presented here and dealing with abnormal situation and accidents are also practiced. The exams are about operating skills and ability to tackle the abnormal situation and accidents. They are operational and practical ones. All exams are supervised by the committee of evaluation.

All trainees are expected to submit papers of which the themes are set based on the actual situation of the trainees' plants, recognized by the experts of that plant and finalized by the committee of evaluation. The guidance is undertaken by both the experts from plants and professors from colleges. The paper defense is conducted by the committee of evaluation.

The main duties of the committee of evaluation are to evaluate instruction of teachers and tutors and learning and practice of trainees as well.

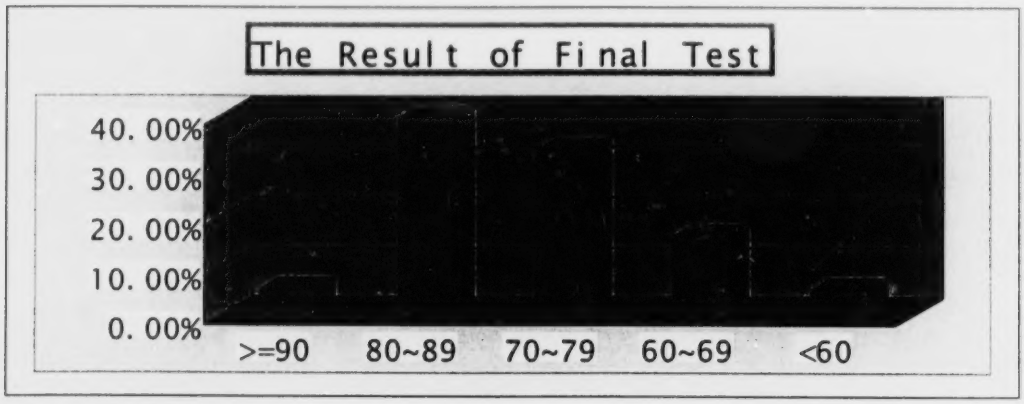

Fig.4 The Result of Final Test (At the End of Program)

The selection of the committee members is done strictly and carefully through the whole area of north China from among well-known scholars and experts. A third come from colleges and another third from power plants, the rest one from other units. The total number usually reaches about 20.

SERVICE SUPPORT FOR EEFVETS

Finally, the service support to **EEVETS** is also very important and valuable. The mode of project management is applied to vocational education and training.

A administrative group with the connection and coordination with the enterprises as their duty is set to

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conduct the program. This group is also the organizer and coordinator in the college. In this group two divisions are responsible for instruction and services. The teams in the instruction division are responsible for feed-backs of students and evaluation of the teachers and routines etc. The teams in the services provide the accommodation, entertainment, health care and other needs and requirements. Their services are covering both the students and teachers. The existing human resources and equipment in colleges and enterprises are utilized thoroughly for providing the services.

CONCLUSION

With the rapid development of electric industry the linkage between colleges and enterprises becomes more and more tight. Vocational education and training plays a role of reservoir (talents bank) and gas station (life-long learning). The systematic method is applied to put all employees in the parallel orbit so as to optimize production elements, raise productivity and improve the operation of the enterprises wholly.

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THE CONDITION AND COMPETENCY OF MULTI-ENTRANCES FOR PERSONNEL TRAINING OF INDUSTRIAL DESIGN ENGINEER IN TAIWAN

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Index: Industrial Design Education, Multi-Entrances, Learning Effectiveness

Abstract: The policy of college multi-entrances would enable students to select favorite departments and majors according to their interest and abilities, and also to increase the opportunities of being selected. This study tries to find the relationship between the channel of multi-entrances and learning effectiveness, then it sorts out the proper entrance channel and the requirements in personality and competency for students in industrial design department. Furthermore, instructors can refer the study results to improve students' learning effectiveness and further promote the personnel training of industrial design engineer in industrial design education to achieve a successful education quality and performance.

INTRODUCTION

The joint college entrance exam is the only channel for entering colleges in the past in Taiwan. Due to the lack of interest testing, students would not be properly instructed with regard to major field of study according to their interest and therefore causes the waste of educational resources for those departments requiring special disposition and basic technique. In 1998, the Ministry of Education announced that the ways of entering college for college bound students would change to "multi-entrances" instead of depending on only one-time examination in order to popularize compulsory education and to promote people's educational capacity. At present, the channels of entering colleges become more and more flexible. However, people question whether or not students coming from different channels have similar performance in learning effectiveness. In other words, is there any positive relationship between learning performance and entering channels? Furthermore, what are the main required factors influencing students' learning effectiveness? The above-mentioned questions should be highly concerned and addressed with the best solution possible.

The Ministry of Education adopted "multi-entrances" including application, recommended exam and joint-exam. All colleges can decide their own requirements of selecting students, especially majors in creative design and art. For example, extra design practice exam, portfolio review and oral interview can be used for further advanced choice to achieve the goal of selecting right person for the right field.

Therefore, the purpose of this study is to investigate the extent to which characteristics of personality and competency would be required for students in industrial design in order to have better learning performance. Furthermore, the study focuses on analyzing the relationship between these required characteristics and different channels of entrance.

LITERATURE REVIEW

Based on the opinions of scholar and expert, "creativity", "expression capability", "aesthetics general capability" are the required competencies for the students majored in industrial design engineering. Furthermore, "form capability", "analysis capability", "imaginative power", "planning ability", "observation ability", "sensibility" are also very important to those students as well.

After comparing the required competencies of industrial design students with types of personnel attributes, the study found that there are three types of attributes associated with requirements and competencies for industrial design students according to Holland's personnel attributes:

(1) Artistic - It is the most important requirement attributable for industrial design students. It includes the ability of art, creation, innovation, and sense. Students can express beauty, thought and feeling through text, action, voice and color.

(2) Investigative – It is also an important requirement next to artistic. This type of students can utilize their intelligence and analytical ability to observe, evaluate, judge and solve problems.

(3) Enterprising – This type is as important as investigative. People of enterprising can utilize their abilities of planning and leadership to arrange affairs and manage peoples for promoting the benefits of organization, politics, economy and society.

RESEARCH METHODOLOGY

The study selects students from industrial design department as samples in survey. The study first adopts literature review method to sort out the essential characteristics such as the ability of creation, innovation and analysis for industrial design students, and then utilizes those requirements to compare with Holland's personnel attributes in order to summarize the required characteristics for industrial design students. The relationship between students' characteristics and learning effectiveness in industrial design field from different ways of entrance is further analyzed. In addition, the factors affecting students' learning effectiveness are also investigated as well. Finally, the study proceeds statistical analysis based on grade evaluation from related industrial design courses to understand the relationship between the learning effectiveness and multi-entrances.

The research tools include three parts in the study:

(1) Questionnaire of personnel attributes based on Holland's six attributes from the literature.

(2) Questionnaire survey of effective learning from students.- according to student's opinions, the result of study would show the effective learning in different courses. The survey adopts Likert scale measurement, from 1 to 5 for "very bad" to "very good".

(3) Grades of related design courses.- course grades include fundamental design, color study, sketching, engineering drawing.

RESULT AND DISCUSSION

Related numbers are shown as box plots and relevant analysis with SPSS software is used to perform the analysis. The upper and lower lines in the box plots chart stand for the largest and the smallest numbers. The middle bold line stands for the media; the shadow stands for the deviation; the middle of shadow stands for the mean; entrance method 1 stands for joint entrance exam, method 2

stands for recommended interview, and method 3 stands for application of entrance. The analysis is as following:

(1) Comparison of student's interest and characteristic from different types of entrances

The comparison of student's personnel attributes on artistic, investigative, and enterprising types from different types of entrances are shown in figures 1. The study obviously appears that the mean and media of three types of personalities for students from "recommended-exam" and " application entrance". In addition, the scatter of personality for "Joint-exam" students is wider than the others.

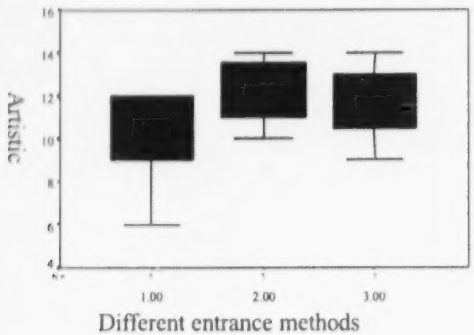

Figure1. Students' personnel attributes on artistic type from different entrance methods (1stand for Joint entrance exam, 2 stand for recommended exam, 3 stand for application entrance)

(2) Comparison of student's learning performance from different types of entrances

Figures 2 illustrate the comparison of student's learning performance on fundamental design, sketching, engineering drawing and color study classes from different types of entrances. It appears that students from "application entrance" have the best performance in the classes of fundamental design, sketching and engineering drawing within three different groups. Furthermore, " recommended-exam" students rank the second. Students from "Joint entrance exam" don't have a good performance in the classes, especially in the sketching and fundamental design. The result further indicates that learning and training of fundamental art and design in the past for those students from each of the three cohorts would be considered to be basic components necessary to help with the link of associated classes in college.

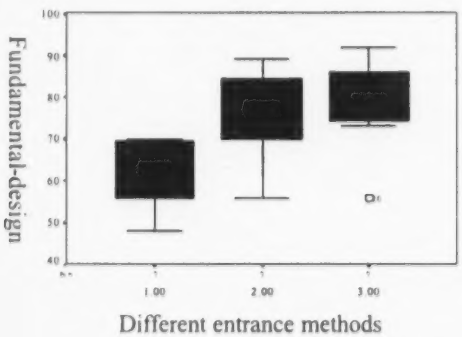

Figure2. Grades of fundamental-design course from different entrance methods

(3) Teaching evaluation from students of different types of entrance

Students from the channel of "application-entrance" have higher learning evaluation for study of fundamental design, sketching and color courses than the other groups. (see figures 3). In figure 11, the result shows that the different groups from the three types of entrances have a similar teaching evaluation for study of drawing. As a result, students from the channels of "application" and "recommended exam" entrances have the better performance and acceptance of classes than students from the entrance of "joint exam". The study found that students from "application" and "recommended exam" entrances have good evaluation for the study of fundamental design, sketching and color study because basically they are equipped with better fundamentals of drawing and art.

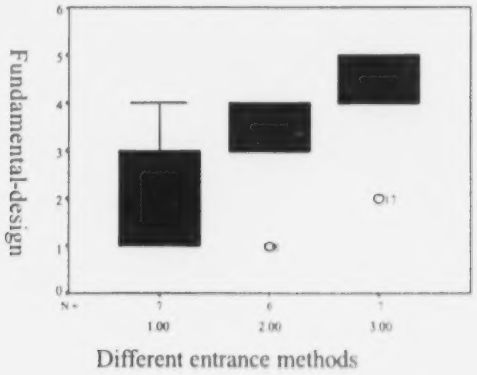

Figure3. Teaching evaluation for fundamental-design course from different entrance methods

(4) The relationship between learning performance and personnel attributes

Table 1 illustrates a significant relationship between the performance in sketching class and personality of artistic type. In addition, the result shows that there is a positive relationship between the performance of sketching and fundamental design. The strong relationship between sketching and artistic characteristics is also shown in Figure 4. However, the study shows there is no relationship between fundamental design and artistic characteristic. Furthermore, it found that fundamental design class requires not only aesthetics but also the creation of physical concept so students with artistic personality can not totally raise their performance.

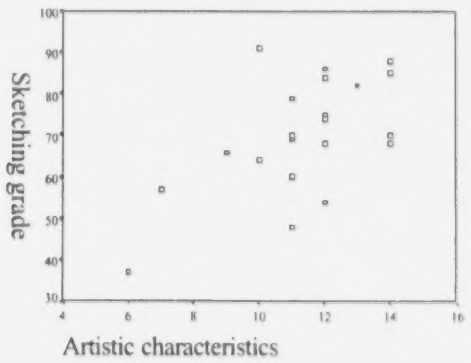

Figure4. The relationship between sketching grade and artistic characteristics

(5) The relationship between evaluation of design course and characteristics of personality

Table 2 reveals a significant relationship between the characteristics of artistic personality and learning evaluation for the study of fundamental design, sketching, and color courses. The result indicates that students with characteristics of artistic personality have a better acceptance of learning in the classes of artistic creation such as fundamental design, sketching and color courses.

Table 1. The relationship between the course performance and the personality of artistic type

		Artistic	Sketching grade
Fundamental design	Pearson Correl. Coef.	0.320	0.659**
	Significant(Two tail)	0.157	0.001
Sketching	Pearson Correl. Coef.	0.585**	
	Significant(Two tail)	0.005	
Color courses	Pearson Correl. Coef.	-0.279	-0.131
	Significant(Two tail)	0.220	0.570
Drawing	Pearson Corre Coef.	-0.279	0.278
	Significant(Two tail)	0.234	0.235

** Statistically significant, p=0.01,(Two tail)

* Statistically significant, p=0.05,(Two tail)

Table 2. The relationship between evaluation of Design Course and Artistic Personality

Design Course		Artistic Personality
Fundamental design	Pearson Correl. Coef.	0.726**
	Significant(Two tail)	0.000
Sketching	Pearson Correl.Coef.	0.473*
	Significant(Two tail)	0.031
Color courses	Pearson Correl. Coef.	0.525*
	Significant(Two tail)	0.014
Drawing	Pearson Correl. Coef.	0.127
	Significant(Two tail)	0.584

** Statistically significant, p<0.01,(Two tail)

* Statistically significant, p=0.05,(Two tail)

CONCLUSION AND SUGGESTION

(1) The study reveals that there is a positive relationship between performance of sketching class and characteristics of artistic personality for industrial design students. But, the study also shows that it is necessary for further research on the performance of fundamental design and color study

classes and the characteristics of artistic personality because the study showed that there is no relationship between them.

(2) The study concludes that students with "application entrance" have the highest performance in design related classes except for color study class; the students with "recommended exam – entrance" is next , and the students with "Joint exam – entrance" is the last. In the aspect of personality characteristics, the average and medium score for students in artistic, investigative and enterprising for "joint-exam-entrance" is lower than students with entrances of recommended – exam and application. In addition, students with "joint exam " entrance are more spreading out in personality characteristics. Furthermore, in the aspect of class evaluation, students from the "application – entrance" have the highest evaluation in the artistic classes than the other groups. For the "engineering drawing class", there is a similar evaluation in the three different groups of students. In conclusion, the study shows that students from the entrance channels of "recommended – exam" and "application" have a proper foundation of art and have more interest in major of design and art before entering school. And, they have better performance, artistic characteristic and acceptance of the classes than students coming from the "joint – exam " entrance.

(3) As a result of statistical analysis, students from the "joint-exam" entrance have wide dispersion in studying courses, and it shows that some of students may be suitable for major in industrial design but some others don't. Therefore, teachers should pay more attention to students' personality and characteristics and give more instruction to high quality students so that they would have better opportunity to enhance their further learning.

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ESTABLISHMENT OF THE ADVANCED PRINTING TECHNOLOGY CENTRE AT HONG KONG INSTITUTE OF VOCATIONAL EDUCATION (KWUN TONG)

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Abstract: This paper describes an industry and academic partnership initiative at Hong Kong Institute of Vocational Education (Kwun Tong). The project includes the establishment of the Advanced Printing Technology Centre at the Institute using a US$1.1 million funding from the Government. The Centre has set up a state-of-the-art digital printing production environment with equipment connected together using high-speed computer network. Generous support has been obtained from equipment manufacturers, which have installed about US$2.3 million worth of advanced equipment at the Centre. This initiative has created a 3-way winning situation for the students, the industry, and the equipment manufacturers. The students can acquire hands-on experience in using the advanced printing equipment, the printing industry can send its personnel to the Centre to receive training, and finally the manufacturers can use the Centre to showcase their latest products. This kind of establishment creates a partnership model that benefits all parties concerned and the model can be extended to other industries as well.

INTRODUCTION

Innovation and technology support initiatives have been implemented in many countries around the world. These government programmes typically provide financial assistance to tertiary institutions, trade associations, and non-profit organisations to develop innovative products and services with the objective that these innovations will contribute to the economic prosperity of the local economy. This paper describes the establishment of the Advanced Printing Technology Centre (APTEC) at Hong Kong Institute of Vocational Education (Kwun Tong) using a grant of US$1.1 million from the Innovation and Technology Fund. The Fund is an initiative administered by the Industry Department of the Government of the Hong Kong Special Administrative Region with the prime objective to support the development of new technology and its application in industry. The Centre has received generous support from major equipment suppliers - it is equipped with US$2.3 million worth of latest digital printing equipment, which are provided by the suppliers on a consignment basis. Using these equipment and the money from the Fund, the Centre has set up a multi-vendor digital printing production environment with equipment connected together using high-speed computer network.

PRINTING INDUSTRY IN HONG KONG

Hong Kong is one of the four largest printing and publishing centres of the world. In particular, Hong Kong's printing industry is well acclaimed for its quality, quick delivery, competitive pricing and ability to cope with short run printing jobs. To maintain this leading position, the industry is keen in upgrading itself through continued investment in advanced machinery and equipment. In fact, Hong Kong's printers installed the world's 2nd and 3rd ten-colour offset printing presses, which costed more than US$2.5 million each. Apart from the local printing establishments, the industry also attracted major foreign investment, which reached US$295 million in 1996.

Despite the willingness of the printing industry to invest heavily in capital equipment, Hong Kong is

slower than other neighbouring Asian countries in moving to the new era of digital technology. For example, in 1999, the world wide installation of computer-to-plate (CTP) equipment, a major component of digital printing, was over 3,000, whereas in Hong Kong, there was less than 10 CTP equipment installed. One may find high-end computer graphics equipment running in local printing companies, but in most cases, the equipment are not linked up in a well-defined network of workflow. The major reasons for this phenomenon are:

1) The digital printing technology is still evolving very quickly and the equipment can become obsolete in a short period.
2) There are different industry standards, and connectivity of the equipment manufactured by different suppliers is still a problem.
3) There is a lack of knowledge and expertise among the business executives and technical professionals in the local printing industry to manage a "digital printing factory".

BACKGROUND ON THE ESTABLISHMENT OF APTEC

The Hong Kong Printers Association (HKPA), which was established in 1939, is the oldest and largest printing association in Hong Kong. For many years, the Association has been very actively in supporting vocational education and promoting technology development. Recently the Association recognises the threat of fierce competition from the neigbouring countries and also the benefit of adopting the digital technology to the printing business. They approached the Printing Department of the Hong Kong Institute of Vocational Education (Kwun Tong), IVE(KT), regarding a collaboration to establish a technology transfer centre in the areas of electronic publishing and digital printing at the Institute. The Institute is the only education institution in Hong Kong that offers post-secondary vocational education in the printing discipline. And in recent years, the academic programme has been revamped in order to satisfy the changing manpower needs of the printing industry. The Institute's management agreed to co-operate with the Association because it believes that it is important to support the printing industry to educate its workforce concerning this new technology. Moreover, by having the technology transfer center at the Institute, the academic staff can acquire the latest information on the development of digital printing and the students can have the opportunity to learn using the new equipment. A proposal was submitted to the Industry Department and in mid 1999, a grant of US$1.1 million was approved by the government to establish the Advanced Printing Technology Centre at IVE(KT).

OBJECTIVES OF THE CENTRE

In order to support the printing industry, the Centre must establish itself as a leader in the field and should operate in a pro-active manner. It has the following objectives:

1) To promote the application of the electronic publishing and digital printing workflow to the local printing and publishing industry.
2) To educate the personnel in the industry on the migration from traditional manual publishing, prepress and printing operations to the new computer integrated workflow.
3) To create a real-life production environment to facilitate the investment decision of the companies in adopting the new technologies.
4) To organise tailor-made training programmes for company executives to cope with the impact of the digital technology to their business.
5) To promote the transfer of technology and dissemination of information from overseas equipment manufacturers to the local printing industry.

CURRENT DEVELOPMENT

The Centre was established in late 1999 and has 5 professional staff. It is divided into 3 sections: digital photography, electronic publishing, and digital printing. The equipment suppliers have been very supportive and have provided many state-of-the-art digital printing equipment to the Centre. Agreements have been reached with the suppliers that they will replace the equipment with newer models in a 6 - 12 month interval in order to maintain the latest equipment at the Centre. Major supporting companies included:

	Company	Equipment/Software
1.	Xerox	DocuColor 40 System w/ Splash Server DocuTech DT135 B/W Publishing System DigiPath Software
2.	Agfa	Galileo 'S' Platesetter Plate Manager with 2 Bins & Cassette Agfa LithoStar LP150 On Line Processor Apogee Workflow System ADTX RAID System Agfa Sherpa2 Imposition Proofer
3.	Dainippon Screen	Cezanne FT-S5000 Digital Proofing System PlateRite 8000 w/ Off Line Processor & Compressor Trueflow Digital Workflow System
4.	China Yin King - Purup Eskofot	EskoScan 2024 - LW Scanner (incl. EskoDDS & Perfection NT Kit Register Punch Unit)
5.	Scitex	Leaf Cantare Digital Camera Iris 43" Wide Proofer Brisque Workflow System (incl. Improof 750I/F + PDF2GO + Extreme Option and Export PS S/W option) Eversmart Supreme Scanner (incl. Scanner Oil Mounting Station & Eversmart Dot Kit)
6.	Heidelberg	Tango iXL Scanner w/ Tango Mount XL LinoColor 6.0

The total value of the equipment at the Centre is about US$2.3 million.

MANAGEMENT STRUCTURE

A Steering Committee (SC) is formed to establish policies regarding the overall operations and development of the Centre. The SC includes representatives from HKPA, IVE(KT), the Industry Department, academics, and other relevant trade associations. Below the SC is the Management Committee (MC), which includes key executives of HKPA and IVE(KT). It is responsible for the day-to-day management of the Centre and to oversee the implementation of policies and strategies established by the SC. Finally, under the MC is the Administrative Committee (AC), which includes members of the MC and representatives from key supporting equipment manufacturers. The AC is mainly responsible for the formulation of overall administration policies concerning the operation of the Centre and to establish administration procedures to safeguard the interest (e.g., intellectual properties) of the equipment suppliers. By including the equipment suppliers in the AC, it help ensure that the suppliers are involved in the decision making process and smoothen the working relationship between the suppliers and the Centre. The Technical Services Manager is the chief executive of the Centre and he/she is in charge of implementing the policies and strategies of the Centre. Figure 1 shows the management structure of the APTEC.

PERFORMANCE INDICATORS

The success of the project is measured by several performance indicators, including the number of technical visits, technology transfer seminars, training courses and consultancy services provided to the industry. And above all, the most important performance metric is the number of companies that have successfully implemented the digital workflow because of the services they have utilised at the Centre.

BENEFITS TO THE STUDENTS

As digital printing is a rapidly revolving technology, it is very difficult for an education institution to keep up with the latest development in terms of capital investment and staff training. Hence the Centre is an ideal establishment where it will always maintain the latest equipment on the premises. In addition, the suppliers have agreed to offer technical training to the Centre's personnel so that the latter can in term teach the students and professionals in the printing field. The students are the prime beneficiaries of the Centre because they can acquire hands-on experience in using the sophisticated equipment, which will give them a competitive advantage when they enter the job market upon graduation.

BENEFITS TO THE PRINTING INDUSTRY

The printing industry in Hong Kong is currently at the crossroad where important investment decision has to be made regarding the purchase of the advanced digital printing equipment. On one hand they feel it is imperative to move into the "digital era" but on the other hand they are concerned about the lack of properly trained professionals who can master the technology. APTEC can offer the industry training programmes, consultancy and pilot production services. And through a membership subscription programme, member companies may use the Centre's equipment on a trial basis so that they can actually test the performance of the equipment before making procurement decisions.

BENEFITS TO THE EQUIPMENT SUPPLIERS

The application of digital printing technology in Hong Kong is slow compared to other printing centres of the world, hence the equipment suppliers are anxious to expand their presence in this market. By providing the equipment at the Centre, the suppliers may use it as a demonstration centre

for their perspective clients. Furthermore, by offering training programmes to the professionals in the printing industry, it will increase their awareness concerning the importance of the technology. Although the equipment at the Centre represents an investment on the part of the suppliers, over the long run, they would be able to recover the cost through the sale of more digital equipment.

CONCLUSION

The establishment of the Centre has created a 3-way winning situation for the students, the printing industry, and the equipment manufacturers. Not only can the industry develop and upgrade their technical know-how in digital printing, students from the Printing Department can also acquire skills and knowledge in using these state-of-the-art equipment, which will definitely improve their competitiveness when they enter the job market. In addition, suppliers may use their equipment at the Centre to educate the industry regarding their products. This kind of establishment creates a partnership model that benefits all parties concerned and the model can be extended to other industries as well.

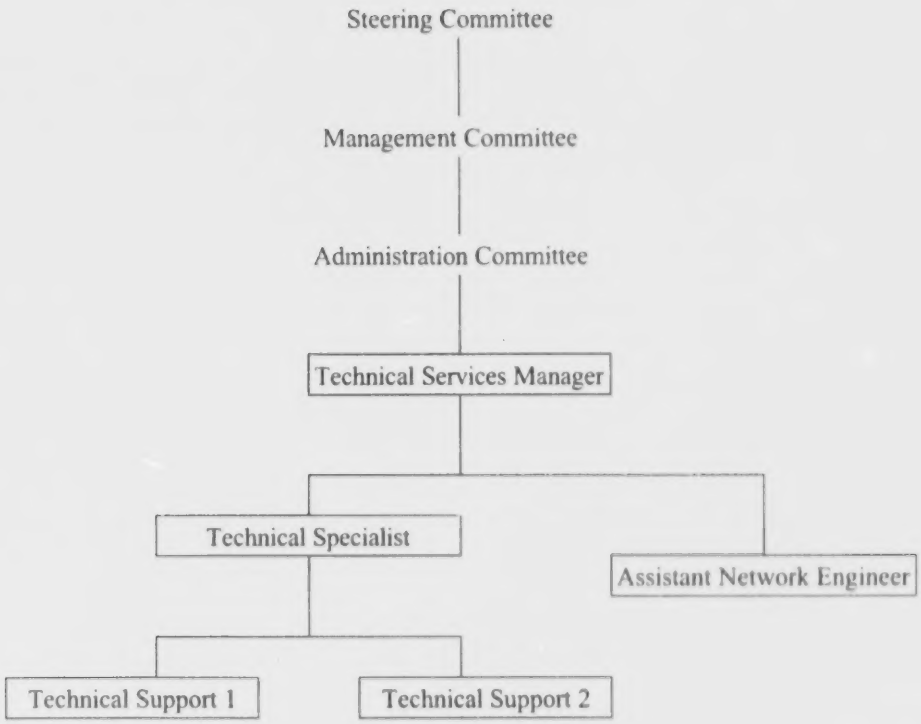

Figure 1 : Management Structure of the
Advanced Printing Technology Centre (APTEC)

PROFILE OF SME SUPPORT IN HONG KONG AND THE SETTING UP OF THE BUSINESS START-UP CENTRE

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Index: Business Start-Up Centre, Business starters -- Hong Kong, The Management Development Centre of Hong Kong, Small and medium enterprises -- Hong Kong, Small and medium enterprises -- Hong Kong – Support

Abstract: SME business forms the major part of the Hong Kong economy. Over 90% of business establishments in Hong Kong are in this category i.e. employing less than 100 persons. These enterprises in total account for the employment of 60% of the local labour force. Small and medium enterprises, as the economic engine, is a major creator of jobs in all industries.

In January 1999, The Management Development Centre of Hong Kong formally set up the Business Start-Up Centre to help small business starters develop their ideas and business plans.

This paper is intended to give an account on the support given to SMEs by the government and various support groups and the setting up of the Business Start-Up Centre in Hong Kong. The promotional and operational issues encountered during the initial stage of the Centre will be highlighted and an update of the Centre's latest results and new initiatives for the future will also be presented.

SMALL AND MEDIUM ENTERPRISES IN HONG KONG

Small business forms the major part of Hong Kong's economy. About 290,000 or 98% of business establishments in Hong Kong are small and medium enterprises (SMEs)*, i.e. employing less than 100 persons. These enterprises in total account for the employment of 1.4 million workers and provide livelihood to 60% of the local labour force. Statistics also show that each small and medium enterprise on average provides employment opportunity for 5.5 persons. They are the major job creators in Hong Kong. Their performance are crucial to Hong Kong's economic revival and prosperity.

* Small and medium enterprises or "SMEs", as defined by the Industry Dept of the Hong Kong Special Administrative Region are establishments employing less than 100 persons for the manufacturing sector or in the case of the non-manufacturing sector, less than 50 persons.

THE NEED FOR ASSISTANCE TO SMEs AND BUSINESS START-UP COMPANIES

The increase in entrepreneurial activity due to the Asian economic crisis, the difficulties faced by SMEs in the present economic environment and the traditional high rate of business failures in small

and medium-sized start-up companies are all factors that have led to the need for the government, support groups in the region and public-funded organisations like The Management Development Centre of Hong Kong to provide due assistance to small business starters such that they can have a better chance to excel and grow their business.

SUPPORT RENDERED TO SMEs BY THE GOVERNMENT AND SUPPORT GROUPS

Recognizing the competitive market that SMEs and business starters are faced with, the government, in partnership with support groups such as statutory bodies, non-government organizations, industrial and trade organizations, introduced a series of government-funding schemes, services and facilities to support the viability of SMEs. The following outlines some of the major initiatives of the government and various support groups in their endeavours to support SMEs in recent years.

GOVERNMENT SUPPORT

In August 1998, the government introduced The Special Finance Scheme to ease the liquidity crunch problem faced by small businesses. Under the Scheme, the government provides guarantee to assist SMEs in securing loans from participating banks and financial institutions. The maximum commitment for the Scheme by the government is HK$5 billion. As funds of the scheme had become fully committed by March 2000, the government ceased to receive new applications for the scheme in April this year.

SERAP (Small Entrepreneur Research Assistance Programme) is another funding programme operated by the Industry Department to help small companies carry out business-oriented research projects at the pre-venture capital stage. Firms are given a grant of not more than HK$2 million. Initially, companies would receive 20% of the sum to do a feasibility test in the first 6 months. Upon the success of this first phase, the project can carry on for another 18 months. Ventures, however, have to repay the grant when it is able to attract revenue.

With an aim to increase the technological capability and competitiveness of the local industry, The Applied Research Fund was established as a venture capital fund which supports the technology ventures of companies in Hong Kong. The Fund is managed by private sector venture capital firms and companies will be assessed on the technical and commercial viability of their proposed technology ventures.

The SME Information Centre established by the Industry Department's Small and Medium Enterprises Office also offers a one-stop information centre on services provided by the government to SMEs. Services include an enquiry service on current services available, a mini-library and computer terminals for free access to the Virtual SME Information Centre.

The Hong Kong Industrial Technology Centre Corporation (Tech Centre) was also set up by the government in 1993 to provide support services to local technology start-ups. The Tech Centre's Technology-based Business Incubation Programme assists small high-tech start-ups to get off the ground by providing them with subsidized rental of office space, operating allowance and a comprehensive package of business services like marketing, management, investment matching and other general services. The Technology Transfer Programme assists local technology companies in sourcing capital and establishing marketing partners and The Seed Capital Funding Services provide funding to high-tech companies through two funding schemes; the Innovation Loan and Early Technology Business Capital Loan.

SUPPORT FROM HONG KONG TRADE DEVELOPMENT COUNCIL

The Hong Kong Trade Development Council, as a statutory organization, provides a range of services which are conducive to the development of SMEs in Hong Kong. Primarily, its SME Service Centre provides trade consulting and business advisory services to SMEs and its "Virtual SME Centre" provides up-to-date business information for small firms on the TDC website. SME Service Stations are also set up in different parts of Hong Kong to help small enterprises access its services and publications and the SME Training Centre was also established to provide a stable venue for training courses offered to small local companies.

SUPPORT FROM HONG KONG PRODUCTIVITY COUNCIL

In December 1997, the Hong Kong Productivity Council also established an SME Centre to enhance the competitiveness of SMEs. The Centre provides services to small businesses in quality management, IT application, business solutions and networking opportunities. Executive seminars and solution workshops are also being organised for SMEs on topics such as IT, operation and business management. A service named ERP (Enterprise Resource Planning) Highway offered by the HKPC also aims to help small and medium-sized companies integrate and automate key processes such as finance, manufacturing and logistics.

SUPPORT FROM THE MANAGEMENT DEVELOPMENT CENTRE OF HONG KONG

The Management Development Centre of Hong Kong (MDC), under the Vocational Training Council, was set up in 1984 with the mission to develop, promote and extend managerial effectiveness in Hong Kong. The MDC also, in recent years, provides assistance to SMEs through developing and organizing training programmes, producing videos and textbooks and offering advisory services to them for improving their skills and knowledge on managing their business.

The Owner Manager Programme, developed by the MDC, covers a great variety of business and management topics such as marketing, finance, accounting, taxation, personal effectiveness, planning, organizing, staffing and controlling. Participants are given the opportunity to seek professional advice from course tutors on problems they encountered in running their businesses.

Realizing the traditional high rate of business failures among business start-ups, the MDC had also developed a comprehensive training programme called "Business Starter Programme" to provide potential entrepreneurs with practical knowledge and skills to evaluate their business plans, carry out market research and conduct feasibility studies so that they are better equipped to start their businesses. It was estimated that a total of 20% of the participants started their business successfully after attending the programme. The success of this programme has also led to the development of a Business Starter Programme on China Business last year for business starters who wish to set up their business in mainland China.

Aside from training courses, the Centre also produces textbooks and videos for the reference and self-learning use of owner managers. In 1995, a book titled 'Case studies in small business management', was published to be used as teaching material and practical reference for owner managers in Hong Kong. The book's real-life cases on small business management in Hong Kong were collected through MDC's own advisory service. A reference book called 'A practical guide for small and medium enterprises' was also published in 1997 to serve as a concise guide to owner managers in business management. More than 30 topics on business operation and management are

covered in the book. In 1994, MDC also produced a training video, "Managing Service to Your Customers" for companies in the service sector of Hong Kong. The video is particularly suitable for small business owners and may be used as training material for running an in-company half-day workshop.

In its effort to provide assistance to SMEs, aside from organizing two interest groups for owner managers and business starters in the MDC, namely, the Hong Kong Owner-Manager Association (HOMA) and the Business Starters Association; the MDC also sponsors an interest group called The Hong Kong Chamber of Small & Medium Business Ltd (HKCSMB). The core members of the Chamber are small business owners and those who are concerned with the development of SMEs in Hong Kong.

Owners of SMEs generally find little resources available locally that can help them solve business problems. To improve on the situation, MDC also offers advisory services to help owner managers solve their problems and improve their skills on managing their business.

THE BUSINESS START-UP CENTRE

To provide a conducive business environment for entrepreneurs to test and implement their business plan, the MDC also set up the Business Start-Up Centre (BSC) in early 1999 with the funding from the Services Support Fund. The BSC provides business and professional advisory services, reference materials, training workshops and office facilities at favourable market rate to business starters such that they can keep their operation cost at economic level, thereby supporting them during the initial phase of their business development. It also provides networking opportunities for individuals who are at the early stage of running their businesses.

RANGE OF SERVICES

There are three types of users in the Business Start-Up Centre:

- registered users (without fixed office)
- registered users with fixed office (half-day)
- registered users with fixed office (full-day)

The following outlines the type of services provided at the Centre:

- *Business advisory service*

  Free business advisory service from professionals on law, accounting, finance, marketing and business management;

- *Business and management courses*

  Participation in talks, seminars and training programmes relevant to business start-ups organized regularly by the Centre;

- *Secretarial service*

  Use of secretarial service;

- *Office equipment*

  Use of office equipment including fax machine, computer, scanner, printer, photocopier, mailbox, locker, personalized telephone and conference room;

- *Business Start-up Association*

  Eligibility for membership to the Business Start-up Association to meet business starters in various industries. Other opportunities for business networking are also available from time to time;

- *Reference materials*

  Use of the Centre's collection of reference materials on business start-ups and the vast collection of management resources in the Learning Resource Centre of the MDC;

- *MDS membership*

  One-year free membership of the Management Development Service (MDS) of the MDC.

Since the opening of the Centre, 181 business starters and 110 potential users had utilised the services of the BSC. Over 300 participants had also attended its training activities. A recent user profile survey indicated that business starters utilising the Centre's services are generally engaged in businesses like China trade, import business, web-content design, e-commerce, and consulting services. In March 1999, a customer satisfaction survey had also been conducted to gauge the level of user satisfaction and to identify areas for improvement. The survey results were encouraging and a high level of satisfaction was rated in most areas. Users generally rated an average of 4 or above on a 5-point scale.

The BSC was established at a time when Hong Kong was experiencing great economic recession and a high rate of unemployment. The success of the BSC has proved that starting a new business is a viable option. Since the setting up of the Centre in January 1999, over one hundred and eighty new companies had utilised the services of the Centre. A number of these companies have become successful, drawing on publicity in newspapers, magazines and TV interviews. This has indirectly created an impact on the awareness of entrepreneurship in Hong Kong. A number of organizations have negotiated with the BSC to look for collaborative opportunities such as the initiation of entrepreneurship among young graduates and vocational students and the solicitation of support from financial institutions and venture capitalists.

FUTURE INITIATIVES

As the Business Start-Up Centre has proved to be an initiative welcomed by many potential business starters, to enhance its services, new developments will be tested within the BSC in the years of 2000 and 2001. In particular, since a significant number of BSC users are IT business starters and to fall in line with the government's strategy of providing a conducive environment to high-tech industries, more resources will be invested in the installation of IT facilities and application software in order to better serve the needs of these users.

The experience of business starters of the BSC are undoubtedly valuable reference materials for would-be entrepreneurs in Hong Kong. As one of its future initiatives, the BSC shall develop self-learning videos and workbooks for the benefit of future entrepreneurs based on the past experiences of these users.

The Business Advisory Service of the BSC has also proved to be a useful support service to business starters. This service shall be further enhanced such that more proactive support would be provided through a Mentor Scheme. The Mentor Scheme assists entrepreneurs by assigning several business starters to a Duty Adviser who will act as their mentor or coach. The mentor will meet with his small group periodically and deal with their start-up problems with an aim to ensure that the start-up process is taken off ground smoothly.

A new website promoting the service of the BSC has also been planned for 2001. It is hoped that through better promotion and marketing, the services of the BSC can be broadly utilised.

Lastly, it has also been envisaged that there is the need for the BSC to develop into a forum for exchange of business ideas and a clearinghouse for business opportunities for business starters through regular meetings held at the Centre.

CONCLUSION

The success of the BSC has indicated that such a business model can be considered on a larger scale. With the foreseeable economic revival in the next quarters, it is anticipated that the demand for such services may experience considerable increase. The IT and consulting businesses are viewed as the major market niche for this type of mobile office set-up as spacious offices and lavish funding are not essential to the operation of these businesses and the essence of their success lies mainly in the imagination and generation of new business ideas.

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ATTACH STRATEGIC IMPORTANCE TO HIGH QUALITY VOCATIONAL AND TECHNICAL EDUCATION

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Index: Vocational and Technical Education, Talents, Culture.

Abstract: Xiamen University has been attaching great important to the display of its superiorities and strategic importance to practical technical education for the new century. The University aims at culturing technical and profession personnel to be used in the frontline of production, construction, management and service. In the area of the distribution of courses and reform of teaching contents, the University takes the culture of basic quality and capability of students as the core task, rationally sets up courses, makes conscientiously good teaching planning, improves textbooks, labs and bases for teaching practices. The University has cooperated with nine local enterprises in joint establishment of field trip and training bases. The University encourages engineering and technical staff of enterprises to joint our teaching staff and hires them as the teachers for field trips and training of students. At the same time, the University sends teacher abroad, other units in China or to industries for studies, aiming at building up a task force comprehending both theory and practices.

With development of science and technology and social progress, many professional posts set higher demands on the expertises of their staff. On the other hand, with the enhancement of people's living standard, more and more people seek for higher learning education. The society sets various demands for higher learning talents and a great many professionals will work in the frontlines of manufacturing, service and management. The cultivation of this type of talents depends on the development higher-learning professional education (Wang Mingda,1999). In recent years, with the development of higher-learning education the case of higher-learning professional education has received more and more attention from various lines. Xiamen University is a comprehensive university and enjoys distinct superiorities in teaching taskforce, education infrastructure, faculties, academic level and higher-learning education experiences. In the process of educational system reform, Xiamen University set up its Vocational and Technical Institute in 1999 based on its long term experiences in higher-learning professional education. The Vocational and Technical Institute is an experimental site for vocational and technical education in the university. This paper intends to discuss some issues for raising educational quality of higher-learning professional talents in the areas of cultivation objectives, distribution of expertise, teaching courses and teaching materials, practice and training. Bases and capacity building of teaching staff.

I. Education Objectives

The objectives of education are associated with meeting the social needs. The development of higher-learning professional education meets not only the needs in China's modernization drive but also follows the great trend in higher –learning education in the world. In the new century when the era of "knowledge economy", a state needs not only high quality "academic" talents but also skill technical talents, in order to maintain its sustainable development by relying on its own capacity. The higher-learning professional education is an integrated part and a type of higher-learning education. It is not a type of lower-level higher-learning education, on the contrary, it is a type of education parallel to common higher-learning education that takes "academic education as its objectives" and becomes

a part of higher-learning education system in China consisting of professional, undergraduate and graduate education (Wang Hu, 1999). Based on this understanding, we are clear that the objectives of high-learning professional education intend to culture professional talents with advanced applied technologies for meeting the needs in the frontlines of manufacturing, construction, management and services. The students receiving higher-learning professional education should become professional talents meeting the urgent needs in local economic development, tradelines and enterprises.

II. Distribution of Faculties

1. There are two principles guiding the distribution of faculties, firstly social needs and secondary education resource superiorities of a school.

Under the principle of social needs, the distribution of faculties should be made in accordance with the needs of local economy and market demand. The distribution of faculties and number of student enrollment should consider the actual needs of technical areas and professional posts (groups), especially the needs of the local large-scale key industries. In this regard, the broad and narrow faculties should be coordinated and the principle of stability and flexibility should be followed in order to give full play the applicable, new, modern and compound features of professional education. For example, the Faculty of Aviation Engineering in Xiamen University is a one of the key faculties meeting urgent social needs.

Higher-learning professional education has to meet very strong practical needs. This feature urges us to change from depending purely on government budget to relying on the cooperation with tradelines and enterterprises, and from enclosed education to opened education. By making full use of education resources of tradelines and enterprises, higher-learning professional education has embarked on the road of joined education by the cooperation between university and industries.

The education superiorities of a school refer to the superior teaching staff and faculties of Xiamen University, including various labs for undergraduate education. The Vocational and Technical Institute of Xiamen University offers courses similar to close to the undergraduate courses, which have been offered by the university. At the same time, the distribution of faculties has taken into consideration the relationship between diversity and changeability of social needs and relative stability of school educational (Liu Zhipeng, 1999).

By following the above principle, the courses offered by the Vocational and Technical Institute of Xiamen University have not only rich teaching resources but also training fields both inside and outside the school. In addition, the courses meet to a certain degree the needs of employment of the graduated student. Moreover, it makes full use of the teaching resources in the school and decreases greatly education costs.

2. Teaching Steering Committee

In line with the education objectives of higher-learning professional education, Vocational and Technical Institute of Xiamen University has set up in each faculty a Teaching Steering Committee consisting of professors of the associated faculty and technical experts from relevant tradelines and enterprise. The Terms of References of Teaching Steering Committee are to set down the education objectives and basic requirements that meet the social needs, set up course system meeting the law of higher-learning professional education, examine and assess teaching plans, propose recommendations to the development of faculties and design-makings, and participate in the implementation of teaching plans, such as giving lectures and arranging field trips.

III. Course System and Teaching Management

1. Principles in course distribution

The distribution of courses is based on the objectives for culturing special talents of with advanced applied technologies meeting the needs of manufacturing, construction, management and services. The distribution of courses is based on the social expertise needs and analysis of professional posts and pays attention to the culture of professional quality and applied technical capability of students. The course systems bear the features of "taking capability as the core, making social requirements and applicability as the rule." Under this principle, the teaching plans are designed and the teaching programmers developed. The public basic courses aim at applicability and the theoretical education and makes comprehension of concepts and reinforcement of applicability as the key points and "necessity and enough for use " as the rule. The culture of capability in the use of computer network and English is emphases. The course of expertise is arranged by taking into consideration of their practical use and dealing well with the relationship between theory and practices and the theoretical education and field trips.

2. Reform teaching contents

Higher-learning professional education has the dual attributes of higher-learning education and professional education (Tan Songhua, 1999). It is a kind of education that takes technical skill and know-how as the teaching key points. Therefore, the teaching contents meet the needs in the culture of theoretical knowledge and practical capability of students and pay attention to the culture of quality of students and the combination of human science and technical education. In the course of teaching, the contents should be refined, deduction process should be less and capacity building and palpability of students should be made the objectives.

3. Putting emphasis on practical education

As the teaching process puts emphasis on practical education, the ratio of course time between theoretical education and practical education is 0.5 0.5 0.6 0.4 the teaching is organized in forms of course modules. The second feature in this regard is that filed training and trips inside and outside the school receive great attention. Xiamen University has cooperated with nine well-known large-scale enterprises in Xiamen and hired teaching and training teachers from these enterprises.

Since the education of higher-learning professional students is designed based on the professional posts we have clearly specified that a quantified graduate should acquired a professional certificate (post certification) in addition to diplomat. In the practical education, attention is paid in culturing a student's capability in acquiring other certificates.

4. Education management system and education quality monitoring system

A series of strict teaching management regulations have been implemented. The regulations include mid-term education check, teaching monitoring, comments on course development, examination and approval in opening a new course, regulations on course examination, requirements on graduation thesis (design) and regulations on giving a course, changing courses or suspending a course of a teacher. As a result, a rather complete guarantee and monitoring system for education quality has been formed and education quality guaranteed.

IV. Teaching Materials Development

The compilation of teaching materials is based on the theoretical basis and knowledge system involved in the practical work, with special attention to the compilation of the teaching materials for

experiments, field trips and trainings. In addition to public courses and basic courses that use the textbooks recommended by the Ministry of Education, we have compiled some textbooks for special courses and used some compiled by other colleges. In addition, we have carried out the following work:

1. Participate actively in the compilation of serial textbooks for higher-learning profession education sponsored by the Ministry of Education and the National Association for Higher-learning Professional Education of Colleges , such as the textbooks for applied writing, computer science, electrics and elecmachenical science
2. By reforming theoretical textbooks, the comprehension of necessary theoretical know-how by students is made as the principle. The textbooks are integrally optimized and combined well with the reform of course system; therefore, the capacity of a student in using technology is enhanced.
3. Textbooks for training and filed trips have received good attention. One way to use foreign textbooks for field trips and training upon some changes. For example, some of the textbooks used in the Faculty of Aeroplane maintenance Service are bought from abroad. In addition, some of the training materials used in the trade lines and enterprises in China are used for textbooks.

V. Capacity-building of Teaching Staff

Xiamen University intends to build up a high level, high quality, capable and stable teaching taskforce for higher-learning professional education. Attention has been paid to select "dual-teaching "teachers from available teaching staff. These teachers have good knowledge of special expertise and rather strong technical skill. The available "dual-teaching" teachers used to work or be trained in the field of various trade lines. The teaching staffs of the Faculty of Law are teachers and concurrently lawyers. Most of the teaching staffs of the Faculty of Aeroplane Maintenance Service are recommended by HAECO and TAECO and have participated in the workshops and training sources sponsored by civil aviation institutions at home and abroad. In addition, they all have visited or studied in HAECO. We are now taking the following measures for improving the quality of our teaching staff.

1). To encourage the teachers qualified for "dual teaching " to transfer to the post for higher-learning professional education.

2). The teachers selected or hired for higher-learning professional education should have education level higher than master. Priorities are given to that with doctor degree and masters qualified for "dual teaching".

3). To develop a system urging teachers to participate in practical work, technical development and follow-up study.

4). To hire experts and technical staffs from trade lines and enterprises as the part-time teachers and field trip tutors.

5). To form a system for assessing and hiring teaching post for higher-learning professional education.

6). To develop a mechanism for cultivating and selecting faculty leaders and teaching backbones for higher-learning professional education and send them for follow-up studies in the regions or countries that are successful in the development of high-learning professional education.

7). To encourage enterprises at home and abroad to set up Education Funds in the Vocational

and Technical Institute.

In addition, we hire managers and technical staffs of tradelines and enterprises as our part-time teachers in line with the development and faculties and education needs.

VI. Development of Bases for Training and Field Trips

1. Improve and perfect the bases for training and field trips inside the school

Xiamen University has a reulation in running higher-learning professional education, namely no enrolled should be made until the bases for training and filed trips inside the school is built up. However, in comparison with the bases for training and field trips outside of school, those inside school are old in facilities and imperfect in their functions, backward in technological level. It is decided upon studies that a great input should be made to improve and perfect the bases for training and field trips inside school.

2. To develop training and field trip bases outside of school are relying on trade lines and enterprises

Xiamen University has jointly built up " Out-School Training Bases for Higher-learning Professional Education of Xiamen University" by cooperating with some well-known enterprises and trade lines. The first group training bases have been set up in nine enterprises, including Xiamen Taikoo Aeroplane Engineering Lt. Co., Air Xiamen Lt. Co. Xiamen Overseas Electronics Lt. Co. and Xiamen Tourism Group Lt., Amoisonic Electronic Lt. Co., the Customers Service Center of United States DELL Computer (China) Lt. Co., Xiamen Fala Development Lt. Co. Xiamen Tourism Group, Xiamen Jingmin Hotel and Xiamen Siming District Court. These are all large scale backbone enterprises and units in Xiamen.

3. Following the road of combining education and industries and build up teaching factories (workshops) and centers

As higher-learning professional education puts more emphasis on the practical capability of a student, Xiamen University intends to invest and build an electronics manufacture for the module of electronics, a workshop for the Faculty of Building Materials and Plastic Processing, improve a simulation court for the Faculty of Law and a simulation lab for stock exchange for the module of finance.

4. Training and field trip programs

Training and filed trip programs are developed in accordance with greater social needs for some work posts and talents and the development in higher-learning professional education inn Xiamen University. We plan to build several integrated training bases for multidisplinaries and several centers for special field trips in the form of cooperation between Xiamen University and industries. The teaching facilities of these centers or bases should be up to the advanced level among the trade in China.

We must have a clear understanding of the phrase that "higher-learning professional education is an important part of higher-learning education." We must transform our sense of education and understand that higher-learning education is a "whole life education " instead of "final education." Higher-learning professional education is a type of whole life education. In this regard, how the state key colleges play their important role in higher-learning professional education by making use full of their education resources? It is an important issue needs earnest studies. We are intending to make our due contribution to China's reform in higher-learning education by engaging in higher-learning professional education.

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CROSS DISCIPLINARY CONTINUING PROFESSIONAL DEVELOPMENT

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Index: Cross Disciplinary Training, Continuing Professional Development

Abstract: The author examined the continuing professional development programmes of the banking and legal professions. He found that, in the years under study, each profession offered a substantial number of training courses that fell within the discipline of the other. There was significant mutuality of training need in the two professions. He concluded that trainers as well as educationalists should, in future, pay more attention to cross disciplinary training and education, especially where Hong Kong harbors the ambition of evolving into a knowledge based society.

INTRODUCTION

In this paper the author uses the Continuing Professional Development (CPD) schemes in the legal and banking professions to illustrate the issue of "Cross-disciplinary Continuing Professional Development". The term here means "that professionals from one discipline acquire in-depth knowledge as well as the modus operandi of another profession in order to enhance their personal value and make contribution to their own discipline"[1].

The author selects the legal and banking professions for analysis for three reasons.

a. The new recruits

In the legal profession, practicing members are required to possess narrowly focused qualifications. They are usually in the form of a first degree in laws (LLB) together with a Professional Certificate in Laws (PCLL). In the case of legal executives, they are usually required to possess a qualification relating to legal studies at the Higher Diploma level. Clerical workers in the legal profession are not required to possess formal law qualifications. They, however, are not permitted to give advice to clients, or engage in court work, or undertake professional activities unless strictly supervised.

Banking professionals have a vastly different profile than legal professionals. Banks offer employment to people from all walks of life. Bank officers may come with a background in science, engineering, business as well as law. Traditionally, banks would take up the responsibility of training their young executives in banking and finance who, at a latter stage, may take over the helm of the company. This is, to a certain extent, still true, but most banks now rely on the tertiary sector to supply them with young men and women who are already well versed in the finance discipline.

b. The changing professions

The legal profession in Hong Kong has undergone significant changes in the past few years. A few years ago the Law Society permitted its members to freely negotiate fees with their clients in conveyancing work. Since then, to the dismay of many solicitors, fees relating to conveyancing practices have taken a nosedive. Many firms have fallen on hard times. Young solicitors, who only

possess legal skills, are experiencing difficulties in securing suitable employment in the profession. The barrister side of the legal profession has fared better because the volume of court work in civil matters has stayed relatively stable. However, it is said that senior members of the bar are increasingly taking up work which was previously relinquished to members of the junior bar.

A few years ago the Law Society deregulated the marketing of legal services by its members. Solicitors are now permitted to do limited marketing of their legal services. Overseas, in the UK, solicitors first advertised their services during the early 1980s[ii]. As a result, UK Personal injury lawyers, or claims negotiators, are said to be selling their services in a rather direct and vulgar fashion. It is reported, no doubt unfairly, that UK solicitor firms display their advertisements among escort agencies and loan sharks in local newspapers[iii]. Advertisement of this nature has not yet appeared in the Hong Kong media although there was a case of a solicitor exhibiting his unclad body in a local magazine, holding a law book next to him. Barristers in Hong Kong seem to be holding their ground on the advertising issue. At a general meeting of the Bar Association, the majority of its member voted down the proposal of allowing barristers to advertise[iv].

There is already a bill in the Legislative council increasing the District Courts' civil jurisdiction, from the present HK$120,000 to a new ceiling of HK$600,000. Solicitors have the right of audience in the District Courts and limited practicing right in the High Courts. It means that solicitors will, in future, take up civil cases which previously were the exclusive domain of barristers. With increasing competition from solicitors, the issue of barrister marketing will, no doubt, again be raised in the future.

In the banking sector recent changes are abundant, to say the least. The proliferation of internet services to the general public has put a lot of pressure on banks to offer web-based banking. Market leaders, such as the HSBC group, have already announced its plan to launch web-banking in the year 2000. Bank of China group, after the impending merger of its 12 sister banks, would have to follow closely if it wants to remain competitive.

On the profitability side, banks are now engaged in a heated mortgage war despite the displeasure of the Hong Kong Monetary Authority (HKMA). The profitability of banks would suffer if this "war" goes on. The most recent mortgage interest rate offer by Standard and Chartered Bank is one percent below the prime rate for new mortgages as well as re-mortgage of domestic property. Anticipating challenging and possibly difficult time ahead for locally incorporated banks, Mr. Joseph Yam, CEO of HKMA, delivered to local bankers a strong message in the Hong Kong Institute of Bankers' Millennium Dinner[v]. Mr. Yam urged banks in Hong Kong to entertain seriously the idea of merging with each other in order to remain competitive.

THE CONTINUING PROFESSIONAL DEVELOPMENT SCHEMES (CPD)

To meet the changing needs of their professions both the Law Society and the Hong Kong Institute of Bankers (HKIB) offer continuing professional development schemes. The Law society has made the CPD scheme mandatory for all solicitors admitted after 1991. Solicitors who fall within this category are required to accumulate a minimum of 15 CPD points each year before they apply for their next year practicing certificates. As a rule of thumb, each CPD point entails a participant to take part in a one-hour learning session.

The CPD courses offered by Law Society are indicative of the continuing and changing needs of the profession. The author has made a review of CPD courses offered by the Law Society during the year 1999[vi]. Of the 155 courses offered, 25 are finance related, 15 are business related excluding those relating to finance. In 1999, a total of 40 (25%) courses offered by Law Society were not law related. The number of non-law courses offered has indicated the needs of the legal professionals to

acquire out-of-discipline knowledge and skills. Twenty-five out of the 40 out-of-discipline courses are finance related. This raises the issue of multi or dual discipline training/education.

One of the mandates of the HKIB is to offer training to banking professionals in Hong Kong for meeting their continuing professional development needs. It runs a CPD scheme similar to that of the Law Society. As HKIB is not legally empowered to grant practicing licenses to its members, its scheme must be on a voluntary basis. Besides holding its traditional professional examinations the HKIB also offer ad-hoc training courses fulfilling the needs of its members. In 1998 it organized 34 courses and seminars for its members[vii]. Out of these 34 courses and seminars, 11 related to the legal discipline, 3 related to china business, 2 related to general issues of the economy, 2 related to investments, 7 related to bank lending, and 9 related to the dual discipline of law and lending. Others are on general issues.

CONCLUSION

After the foregoing analysis the author finds that:

a. A significant proportion of the CPD courses offered by the Law Society are not law related nor dominantly law related. Forty out of the 155 courses offered are business related. Of these 40 courses, 25 are finance related.

b. A significant proportion CPD courses offered by the HKIB are not banking related. Eleven out of the 34 course offered were law related. Out of the 16 lending related courses the author finds that 9 are law related (for example, Legal Issues of Loans Recovery).

The author concludes that cross-disciplinary CPD schemes are a fact of life in the legal and banking professions. He is of the further view that the observed phenomenon may not be confined to the two professions under study. This phenomenon may be found in all generically related professions, and in some unrelated professions. He recommends that formal education in the tertiary sector should take note of this need and provide educational services accordingly, in the form of cross-disciplinary programmes in the full-time and part-time modes.

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[ii] Feature article, "Marketing meets the Law", *Marketing Business, p.22, Dec./January 2000.*

[iii] Ibid, p.24.

[iv] 23.1.2000, South China Morning Post.

[v] HKIB hosted the dinner on 9th December, 1999, in Hong Kong Sheraton Hotel. Mr. Joseph Yam was the key speaker of the occasion, and his speech was widely reported by the local press.

[vi] Law Society also accredits courses offered by outsiders.

[vii] The 1999 summary is not yet available. The 1998 summary is adequate for the purpose of this paper.

ATTITUDES OF UNIVERSITY FACULTY MEMBERS TOWARD STUDENTS WITH DISABILITIES

Marie F. Kraska
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Index: Special Needs; Educational Opportunity; Social Responsibility

Abstract: American colleges and universities are experiencing a continuous enrollment of students with disabilities, especially students with learning disabilities. The Americans with Disabilities Act mandates that institutions of higher education provide full accommodations and services to all students. This study was conducted to ascertain the attitudes of university faculty members toward serving students with disabilities. Seventy-one faculty members representing three broad academic areas in a university in the Southeastern Region of the United States participated in this study. Results of the data analysis revealed statistically significant differences existed between faculty members when they were grouped by academic rank and academic unit.

INTRODUCTION

A study by Fichten, Amsel, Bourdon, and Creti (1988) found that although professors are experts in their respective disciplines, most do not feel they are experts in adapting their courses to students with disabilities. Leyser (1989) found that a large majority of faculty supported the integration of students with physical and sensory disabilities; however, they were less supportive of students with learning disabilities and emotional disabilities. The Leyser study also found that less than one half of the 124 faculty members surveyed were using the resources and support services available to assist students with disabilities.

The removal of architectural barriers on college campuses has been a primary goal of most institutions. However, as Newman (1976) stated: " . . . the barriers to accessibility on college campuses to the handicapped are not only physical . . . attitudinal barriers are at least as salient." Nathanson (1982) reported that faculty attitudes and perceptions are influenced by the amount of contact they have with students with disabilities. Nathanson found that faculty emotions, perceptions, assumptions, beliefs, and expectations all play an integral part in the faculty and student relationship. Jarrow (1987) reported that research evidence indicates that attitudinal barriers are as much a matter of what we say as they are a matter of what we do; but given appropriate support, students with disabilities can be successful in pursuing a postsecondary education.

The increased number of students with disabilities who are being served in higher education and the demands of this population make it imperative that university faculty members be prepared to serve these individuals effectively. Students with disabilities need the assistance provided by a disability services office as well as accommodations in the classroom. Faculty members within each institution of higher education have a legal responsibility to provide accommodations to qualified students with disabilities. An assessment of the current attitudes of faculty members may be helpful in planning, designing, and implementing professional development programs to prepare faculty to serve students with disabilities effectively and efficiently in the regular classroom.

Statement of the Research Problem

Students with disabilities face many of the same challenges as other students as they pursue their college studies. Some students are concerned about the lack of awareness of their unique requirements by college and university faculty members. Attitudinal barriers should not be ignored when striving to provide equal access to higher education for students with disabilities. The attitudes of university faculty members may be a significant determinant in the successful completion of educational experiences for students, with or without disabilities. The lack of information related to the attitudes of university faculty toward serving students with disabilities provided the focal point for this research.

Purpose of the Study

A review of the literature revealed no studies have been completed related to the attitudes of faculty members at small, regional public teaching institutions. The purpose of this study was to investigate the attitudes of faculty members toward serving students with disabilities at a small, regional university in the southeastern region of the United States. Attitudes were examined in relation to selected demographic variables of faculty members.

Research Question

The following research question served to guide this study.

To what extent is there a difference in attitudes of university faculty toward serving students with disabilities as measured by the Survey of Faculty Attitudes Relative to Serving Students with Disabilities questionnaire when faculty are grouped by (a) gender, (b) age, (c) academic rank, (d) academic unit, (e) years of teaching experience, and (f) extent of contact with students with disabilities?

Definition of Terms

Auxiliary aids and services—the term, "auxiliary aids and services," includes (a) qualified interpreters or other effective methods of making aurally delivered materials available to individuals with hearing impairments, (b) qualified readers, taped texts, or other effective methods of making visually delivered materials available to individuals with visual impairments, (c) acquisition or modification of equipment or devices, and (d) other similar services and actions (Americans with Disabilities Act, 1990).

Disability—the term, "disability," means, with respect to an individual: (a) a physical or mental impairment that substantially limits one or more of the major life activities of such individual, (b) a record of such an impairment, or (c) being regarded as having such an impairment (Americans with Disabilities Act, 1990).

Reasonable accommodation—the term, "reasonable accommodation," may include making existing facilities readily accessible and usable by individuals with disabilities (Americans with Disabilities Act, 1990).

Limitations of the Study

1. Only faculty members employed in one small, regional university in the southeastern region of the United States were included in this study.
2. Results were limited to the extent that faculty members responded with their honest feelings.
3. Results were limited to the extent that the research instrument measured the true feelings of the faculty members.
4. A non-response bias may have existed in the non-return rate.

Assumptions of the study

1. Responses to items on the research instrument indicated the true feelings of faculty members.
2. Faculty members had some previous knowledge of the rights of students with disabilities according to legislative mandates.
3. Faculty members had some previous experience interacting with a student with a disability in a classroom setting.
4. The survey instrument was sensitive to faculty attitudinal characteristics.

METHODS AND PROCEDURES

Sources of Data and Collection Procedures

The research instrument and demographic data form were administered to all 106 faculty members employed at a small, regional teaching university in the southeastern region of the United States. Useable data were collected from 32 full-time faculty members and 39 adjunct faculty members. The number of males and females were almost evenly divided, with 35 males and 36 females. The researcher administered the survey instrument and a demographic data sheet in January 1999 to the faculty during a faculty convocation session. Faculty members completed the demographic data sheet and the survey instrument during the convocation session.

Instrumentation

The Survey of Faculty Attitudes Relative to Serving Students with Disabilities instrument was used for this study. This is a 30-item instrument to which participants responded using a Likert-type scale with a range from 5 for "Strongly Agree," to 1 for "Strongly Disagree." Some items are written with positive connotations and some with negative connotations. Sample items include statements such as, "Inclusion of students with disabilities will require significant changes in classroom procedures" and "Inclusion of students with disabilities will necessitate extensive retraining of faculty." A score could range from 30 to 150, with a higher score indicating a more favorable attitude toward students with disabilities.

Procedures for Data Analysis

Data were analyzed using the Statistical Packet for the Social Sciences (SPSS). A one-way analysis of variance statistical procedure (ANOVA) was used to test for differences in mean scores between groups for each of the six independent variables. The .05 level of significance was used. Differences in mean scores were tested between groups when data were grouped as follows: (a) gender, (b) age, (c) academic rank, (d) academic unit, (e) number of years of teaching experience,

and (f) extent of contact with students with disabilities. Minimum and maximum scores, mean scores, and standard deviations were computed for the demographic data.

Results

No statistically significant differences were found for the following variables: (a) gender, (b) age, (c) years of teaching experience, or (d) previous contact with students with disabilities.

The F-ratio of 4.138 indicated statistically significant differences between mean scores for academic rank. Faculty members who did not hold academic rank (instructor and adjunct) had higher mean scores (Mean Score=86.69; SD=6.19) than faculty members who held academic rank (Mean Score=83.50; SD=6.80). The lowest score for the non-academic ranked faculty was 77 and the highest score was 105, whereas the lowest score for faculty who held academic rank was 71 and the highest score was 98.

The F-ratio of 4.337 indicated statistically significant differences between mean scores for academic unit. The mean score for the College of Arts and Sciences (Mean Score=88.16; SD=7.94) was higher than the mean scores for the School of Business (Mean Score=84.48; SD=5.11) and the School of Education (Mean Score=82.96; SD=5.17).

The mean score for all participants was 85.30 with a standard deviation of 6.61. The minimum score for all participants was 71 and the maximum score was 105.

CONCLUSIONS

Overall, faculty members held generally positive attitudes toward serving students with disabilities; however, academic rank and academic units were indicated as statistically significant variables related to faculty attitudes. It appeared that faculty members who did not hold academic rank had more positive attitudes toward serving students with disabilities than faculty members who held academic rank. In addition, faculty members in the College of Arts and Sciences appeared to have more positive attitudes than faculty members in the School of Business and the School of Education. Results of this study suggested that the attitudes of faculty members in this study were similar to faculty attitudes reported in similar studies at other higher education institutions (Fonosch & Schwab, 1981; Schoen, Uysal, & McDonald, 1987). In the Fonosch and Schwab study, results indicated that most faculty members held positive attitudes toward students with disabilities. Faculty members who used more than the lecture method had more positive attitudes toward serving students with disabilities than those who used the lecture method only. Schoen et al. reported that faculty members generally held positive attitudes toward students with disabilities in relation to classroom management issues and compliance with legislative mandates.

Faculty members in the School of Education held the least positive attitudes of serving students with disabilities. This may have been due to the professional stress these faculty members have experienced in recent years. For example, changes in university leadership, increased use of technology, changes in curricula, transition requirements from the quarter to semester system, renewal of accreditation, and lack of faculty input for many of the changes. The combination of countless changes may have taken away some of the concern normally shown to students. In addition, faculty members with academic rank may have answered more frankly due to the fact that they typically are tenured and may feel more secure than their non-ranked, non-tenure track counterparts. Many students transfer into the university from two-year postsecondary institutions; therefore, faculty members who do not hold academic rank may have limited contact with these students due to the fact that they usually teach entry-level courses.

Finally, faculty members in the School of Education may have indicated the least positive attitudes due to doubts that they may have relative to the ability of students with disabilities to master new material and to use assistive technology effectively.

RECOMMENDATIONS

Data for this study included faculty members at only one small, regional university campus; therefore, caution should be taken in generalizing the results beyond institutions similar to the one in this study. Additional research could be conducted at other similar universities to provide a larger data base. A larger data data base may provide a more comprehensive view of faculty attitudes.

Nathanson (1982) suggested that the attitudes of college faculty might have a profound impact on the educational and social integration of students with disabilities. Fichen, Goodrick, Tagalakis, Amsel, and Libman (1990) suggested that faculty attitudes might translate into behaviors that could either facilitate or impede the college experience for students with disabilities.

Additional research may be helpful in assessing the professional development needs of university faculty toward serving students with disabilities. For example, special training programs may help faculty members to increase their knowledge relative to the nature of various disabilities and appropriate accommodations, compliance with legislative mandates, and the use and incorporation of assistive technology into their instructional programs.

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MOBILITY, FLEXIBILITY AND ACCESSIBILITY OF POST-SECONDARY EDUCATION IN HONG KONG

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Index: Accessibility, flexibility, higher, vocational, continuing, education

Abstract: In its recent consultative document, the Education Commission recommended that, through portable and transferable credits, learners' achievements attained through different channels are recognized.

However, this paper argues that:

- Increasing participation should not be viewed as equivalent to widening participation.
- The distinction between continuing education and higher education becomes blurred.

The paper concludes that the policy on lifelong learning seems to have been shaped by two factors economic and social equity. The development of these policies is part of a wider process of change – change in the higher education system, funding mechanisms, and university curricula.

INTRODUCTION: CHANGE AND LIFELONG LEARNING

Recently we often hear people saying that the world is moving towards the information age and a knowledge-based society. Issues such as how people can adapt to this shift as well as the problem of unemployment remain to be solved. However, education, in particular lifelong learning, is frequently perceived as the solution to all these problems.

Some educators and policy-makers believe that, with lifelong learning as a way of keeping people to adapt to the shift towards an information age and a knowledge-based society, there should be a scheme for credit accumulation, thus creating ladders of opportunity for people to gain qualifications. This process will emphasise student choice and student-centred learning; and, through portable and transferable credits, will allow learners to undertake study in one institution and transfer achievement/credits to another at will. This paper attempts to analyse the Education Commission of Hong Kong' policy of widening learning opportunities by facilitating credit transfer among higher education institutions in Hong Kong. In particular, it focuses on considering the merits and challenges of such a shift.

MOBILITY, FLEXIBILITY AND ACCESSIBILITY IN POST-SECONDARY EDUCATION

Countries such as the UK and Australia believe that investment in human resources and in particular, an increased participation rate in both post-school and higher education are essential in gaining competitive economic advantage (Robertson, 1996a; Gallacher et al., 1996). As such, their

policy of increasing and widening access to higher education has an underlying economic agenda (Gallacher et al., 1996).

As Edwards (1993) pointed out, in a Post-Fordist framework, governments will emphasize the need for more highly skilled and multi-skilled flexible workforces if their countries are to compete in the global economy. This in turns leads to educational systems which emphasize vocationalism and flexibility, and help students to gain the kinds of education and training required for them to contribute to economic growth.

The post-secondary education system in the US is characterized by transferable credit, great flexibility and mobility, an approach which is perceived as suitable for mass rather than elite education (Robertson, 1996b). In the UK, the credit accumulation and transfer schemes (CATS) which facilitates student mobility through recognition of learning acquired from participating institutions may also be seen as a development to cater for democratic participation by large number of students (Robertson, 1996b). Hong Kong is now also moving in a similar direction (Education Commission, 2000). As part of the globalization process, the widening of access to adult learners and the practice of credit transfer in countries such as the UK, the US and Australia are influencing policy formation in Hong Kong within a much shorter time scale. However, the problem now is whether Hong Kong has changed, or will change, from elite education to mass education.

THE EDUCATION COMMISSION'S PROPOSAL

In its recent consultative paper, the Education Commission (2000) recommended that 'post-secondary learning opportunities should be increased to align with the knowledge-based society' (p. 7). It also recommended 'universities to work towards a transferable and articulated credit unit system among institutions and departments to allow students more choice of learning modules that suit their pace and learning needs (p. 42). It also suggested that 'universities give recognition to qualification conferred by community colleges' (p. 44). In other words, there should be credit transfer among universities and between universities and community colleges. This would be quite similar to the CAT schemes in the UK which allow students to break away from the traditional model where a degree is acquired by studying a particular curriculum for a set period at a single institution (Dfee, 1998).

Conceptually there are two kinds of credit transfer. One involves recognition of credits gained at a lower level of study which can then be articulated to a higher level of study which is referred to in this paper as 'vertical' transfer of credits, leading to 'upward' mobility of learners. Examples of this are the articulation of the qualifications of Project Springboard (a new programme designed for students who do not have good results in the Hong Kong Certificate of Education Examination), Community Colleges and university degree programmes. The other form of transfer involves recognition of credits gained at a particular institution by another institution at the same level of study 'horizontal' transfer of credits, leading to 'lateral' mobility of learners. An example of this is credit transfer among universities.

WHAT IS THE POLICY FOR?

Colebatch (1998) listed some elements in policy analysis, including the questions 'Who makes the policy?' and 'What is it for?'. He argues that policy-making is a game that not everyone can and does play, and that 'participation is not a neutral question; who participates in a policy issue helps to shape what the issue is' (p. 26).

The key issue appears to be dissatisfaction with the large number of 'failures' in the school system, but this raises a variety of questions. Is there general dissatisfaction with the school system in the society? Who are those most dissatisfied? What is the nature of the dissatisfaction? Is there a need to widen learning opportunities? Who needs these new opportunities? The whole policy is based on perceived answers to the above questions of those who participate in the policy process.

Hong Kong has shifted to a knowledge based society, but this has been accompanied by an increase in unemployment rate and a high level of failure in the school system. It is against such a background that lifelong learning is advocated by the Government. McGivney (1990) identified three major factors that have shaped the policies on widening access for adult students in other countries. Of the three factors, two of them 'government's interest in its economic competitiveness' and 'social justice' can be identified as underlying factors in shaping this policy in Hong Kong. For example, the emphasis on lifelong learning for adaptation to a knowledge-based society assumes that widening learners' access to higher education can develop the economy of Hong Kong. On the other hand, the emphasis that there should be 'no failures' (Education Commission, 1999) is similar to the concern over social equity. It advocates the idea of providing a 'second chance' for those who gained relatively little from education at the school level. But, as will be discussed later, there remains the issue of whether those who fail to benefit from education at the school level are likely to benefit from continuing education.

The Government also advocates flexibility and mobility of students. However, no research has been done to find out the barriers to their learning. It has been assumed by the Government that it is simply a matter of lack of learning opportunities and inadequate flexibility and mobility. But, with the existence of the Open University of Hong Kong since 1989, is there really a lack of learning opportunities? Do the students really need these upward and lateral mobility? Without research, it is hard to justify the argument that the provision of further flexibility and mobility (both upward and lateral) will automatically cater for the needs of the students.

SOME LIKELY CONSEQUENCES OF THE IMPLEMENTATION OF THE POLICY

More market-oriented higher education

The credit transfer system will give more choice to the students who can choose his/her own path of study and mix different courses and programmes from different institutions. This will make higher education more market-oriented.

Blurring of the boundaries between higher education and continuing education

It appears that there are some discourses underlying the formulation of policies by the Hong Kong Government in the areas of education in general and in adult and continuing education in particular. These discourses are:

- Obscuring the boundary between formal secondary schooling and adult and continuing education,
- Eroding boundaries between sectors, institutions and sites of learning.

Changes in the funding system

Since there will be greater mobility of students across higher education institutions if the new policy is implemented, there are funding implications. At present, the universities are funded by the University Grant Committee (UGC) according to the number of full-time equivalent students. As students can move to other universities in their second or third year of study, the funding policy needs to be changed as well. Also, in order not to increase the public expenditure to cope with the widening of participation in higher education, there is a tendency for the Government to adopt a

'user-pay' philosophy in its higher education policy. The Education Commission (2000) stated that 'the proportion of private contribution to education is less than 10% of the total expenditure on education. This is smaller than that in many places' (p. 15).

Transferability of courses

If the universities can agree on a list of 'foundation courses' or 'general education courses', the credits of which can be mutually transferable, these courses would then be regarded as more 'transferable' or more 'marketable' than others. In the present situation in Hong Kong, these courses are more likely to be in the areas like information technology and language skills. Such a development would have an impact on shaping the boundaries of adult education and higher education.

CO-ORDINATION AND IMPLEMENTATION OF THE POLICY

Colebatch (1998) indicated that

> 'policy work takes place across organizational boundaries as well as within them, and consists in the structure of understandings and commitments among participants in different oganizations as well as the hierarchical transmission of authorized decisions within any one organization.' (p. 39)

When the philosophy or rationale adopted by the Education Commission is transmitted to the organizations which implement the policy decisions, how can one ensure that these organizations have the same degree of understanding and commitment. This is particularly significant in an area such as credit transfer as it involves consistent implementation among the institutions concerned. The problem is how to persuade the academic staff involved to acknowledge the benefits obtained as a result of the change a shift in perspective which is unlikely to be achieved by a top-down approach.

ALL ROADS LEADING TO UNIVERSITY EDUCATION?

Can credit transfer enhance social access, participation and equity? There may be new barriers created by the Education Commission's proposal. For example, the programmes in the Community Colleges are, at least to a great extent, self-financed, thus disadvantaging those with limited financial resources.

The notion that learning opportunities has been widened by the policy is more complex that it appears at first to be. At present, 18% of the school leavers can enter the first year of university. If this provision is not going to be changed, it is only a matter who gets the places. As far as sub-degree programmes are concerned, many opportunities already exist in Hong Kong, including the various certificate and diploma courses offered in some universities and their Continuing Education Units as well as the Vocational Training Council. There is already intense competition among the providers for a limited pool of students, so the introduction of Community Colleges and the arrangement for articulation of their programmes to degree programmes cannot be seen as a step towards the widening of opportunities for learners.

Another related issue is that the relative proportions of Associate Degree graduates of these community colleges entering the employment market as against entering universities is not yet

known. However, Tight (1993, p. 66) argued that 'the prospect of obtaining a degree is used as a major, and usually *the* major, selling point in the marketing of access courses.'

Increasing participation should not be viewed as equivalent to widening participation. Implementation of the policy of credit transfer can result in the former without necessarily leading to the latter. It may be the same group of learners (probably the advantaged group) who can climb up the ladder under the system. In other words, those who can successfully get the certificates will go on for a diploma and finally a degree programme.

SOCIOLOGICAL PERSPECTIVES: ECONOMIC GROWTH VS SOCIAL EQUALITY

The Education Commission espouses the advantages of widening access to learners and credit transfer among other higher education institutions as if it was a new concept in Hong Kong. But one cannot overlook the fact that the Open University of Hong Kong has put this concept into practice and implemented a policy of open access and credit transfer for ten years.

Open education philosophy derives from a 'democratic' view of education – education that is accessible to all students regardless of social origin (Gallacher, 1996). Robertson (1996a) described two different perceptions of the role of universities in society from two sociological positions: right-wing governments see universities as engines of economic growth while the left-wing governments view them as agents of social equality. One may use this distinction in ideology (economic growth vs social equality) as an analytical tool to analyse the Hong Kong Government's views on higher education, in particular the policy of establishing a comprehensive mechanism for qualifications to be freely transferable.

It is debatable whether the Hong Kong Government views higher education essentially from an 'economic growth' or 'social equality' perspective. On the surface, it would like to increase the flexibility of students' learning paths. But research in the UK (Dfee,1998; NIACE, 1997) has indicated that students who are not successful in their formal education are also less likely to benefit from other forms of adult and continuing education, especially those leading to qualifications. Also, the fact that a substantial proportion of the population is denied access to higher education results from a combination of low motivation to learn and inadequate supply of places. However, the underlying assumption in the policy document is that only the latter needs to be considered. That is, the Government assumes that students wish to study but have been deprived of opportunities in the past. Is this really the case? Therefore, the Government's intention – to solve problems arising from formal secondary school education by continuing education may not work as it wishes.

CONCLUSION

The policy on lifelong learning proposed by the Education Commission seems to have been shaped by two factors economic and social equity factors. However, it appears that the former is the main concern of the Government, with the latter serving only a rhetorical role. Similar to developments in other countries (Robertson, 1996b, Commission of Social Justice, 1996), the intention of the Government to widen access to higher education is also a shift from elite education to democratic mass participation. Credit transfer, in particular where it leads to upward mobility of learners, is one of the means to achieve these ends. But, as the Commission of Social Justice (1996) pointed out, 'if standards are to be maintained, more students mean more resources' (p. 196). Although the Education Commission consultative document has clearly indicated its wish to increase the post-

secondary learning opportunities, it has neither proposed an increase in funding in the sector, nor an increase in degree places. Therefore, the credit transfer system alone will not genuinely increase the learning opportunities in society. It is a matter of who gets the places.

The policy, driven by underlying economic agendas, will be far reaching and the process of change will continue to shape higher education and continuing education in Hong Kong. How can those under-skilled workers and failures in the secondary schools adapt in a society claimed to have changed to a knowledge-based one? Can the new policy help them? In all these approaches to change, the emphasis on access to higher education will be associated with a growing concern with vocationalism. The development of these policies must be seen as part of a wider process of change – change in the higher education system, funding mechanisms, university curricula and role of higher education in society.

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VOCATIONAL EDUCATION IN ENGINEERING IN THE INFORMATION AGE

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Index: Course Development, Partnership, Vocational Education, IT.

Abstract: Learning new skills or acquiring new knowledge is becoming part of life for most adults. Indeed, the paradigm of life-long learning has found advocates not only in individuals but also policy-makers. In the information age, life-long learning will be increasingly dependent on the successful application of information and communication technology. This paper outlines recent curriculum developments of this department, highlighting information technology applications for course delivery and management. In catering for the changing needs of local industry, the department seeks to establish partnership with local companies, aiming to expand the department's scope on life-long learning provision at the same time.

INTRODUCTION

Over the past few decades, Hong Kong has transformed itself from a labour-intensive to a service economy. Now, the economy is heading towards a knowledge-based one where intellectual capital takes center stage. Increasingly, employers expect their workforce to be multi-skilled and their employees to have cerebral skills over manual skills. The economic landscape is changing rapidly. In response to these changes, the Hong Kong SAR government is keen to foster a strong life-long learning culture in society, such that the workforce would keep on learning and upgrading their skills and knowledge in order to compete in the global market. As put forward in the 1998 policy address, the government has in fact envisioned Hong Kong becoming a learning society.

To enhance employability, according to a recent survey, 85% of the respondents perceived qualification as a major factor. At present, there are over 300,000 people, some 10% of the working population, receiving continuing education at the higher education level. In satisfying such a demand for self-advancement, there are more than 150 overseas academic and professional institutions, offering over 500 programmes for local consumption. Yet, there are over 700,000 workers, who are over 40, with formal education no higher than Form 3. Based on figures available in year 2000 first quarter, the unemployment rate for this age group was about 6.9%, which was higher than the overall rate of 6.1%. Of even greater concern was the high unemployment rate amongst youths: for the 15-19 age group, it was about 29%. Vocational education providers should therefore seek to offer more opportunities for these two groups, which are particularly vulnerable to future economic changes.

In the information age, e-class room is emerging, making use of information technology(IT), such as video-conferencing, streaming video, and networked PC or the internet for education and training delivery. It offers greater flexibility to learners, overcoming constraints imposed by geography or time. In a city like Hong Kong, where many work irregular hours or travel frequently, learning and self-improvement through IT is a very attractive option. In fact, similar to experience overseas, for instance Edling (2000) and Fayter (1998), many local tertiary institutions are experimenting with the idea of virtual university. Feedback so far has been positive both from students and lecturers. On the whole, the use of IT has shown to greatly enhance traditional methods, adding flexibility, variety, and

convenience to service delivery. Obviously, there are negative effects too, in particular, the lack of human contacts. Nonetheless, with 30% of the population using the internet, especially amongst younger population, the use of IT for teaching and learning must be carefully developed such that wider distribution of knowledge can be achieved at lower costs.

COURSE DEVELOPMENT

The existing courses of this department serve a large cross-section of the community, ranging from young secondary school-leavers of Form 5 or 7 standards, mainly for full-time programmes, to those who are in their late 30's working in the industry taking part-time programmes. By and large, their educational needs are satisfied by a common academic programme, which is comprehensively covered by the department's suites of courses. The development of these suites of courses has been based on many factors, for instance, the need for such courses, the provision of similar courses in Hong Kong and the career prospects for graduates. In addition, efforts have been made to design courses of high academic standards with well-integrated engineering application materials. The aims of our courses are to produce engineering professionals who have a broad based understanding of engineering science and at the same time, develop trade skills which meet the needs of the employers. Bearing in mind the vocational character of these courses, it should be stressed that graduates should have an in-depth knowledge of installation, testing, commissioning, operation and maintenance of systems as well as a good understanding of the application of modern digital electronic control.

These course aims are achieved initially through a curriculum structure that is based on a very well established classical programme. This programme includes theoretical core subjects and more importantly extensive practical training. With the development and expansion of the information technology, current syllabuses now rely heavily on the applications of computers in the process of teaching and learning. Computer application includes interactive communication and simulation of processes and systems which are extremely useful tool to assist learning.

The courses to be offered in the future by this department will extend beyond traditional market segments. In addition to offering courses that award academic qualifications, the department will expand its range of courses gearing towards professional qualifications. For the graduates of these courses (including the academic and the professional ones), the department will design and offer many continuing development programmes to help them keeping abreast with the developments in their own fields. On the other hand, attention will increasingly be given to satisfying the needs for self-advancement and continuing education of the growing population who are without the necessary knowledge and skills for the changing needs of the economy. In those cases, the format and content of the programmes will be designed to suit the academic background of potential students and prevailing economic enviroment. Short courses, training programmes, skills-based workshops will be offered and supported at every possible instance by the application of the information technology. These courses will be designed and developed in close co-operation with external organisations such as government agencies, academic institutions and the industrial sector.

IT APPLICATIONS

Recognizing the importance of information technology in vocational education, the VTC has recently launched an extensive programme to upgrade the computer infrastructure to provide the necessary support to teaching departments for course delivery and management. The department is now in pursuit of making the necessary changes to make the best use of this technology in our teaching and learning programmes, course management and related activities.

As a first step, teaching and learning materials are revised and prepared in electronic format, including lecture notes, tutorials and laboratory instructions, PowerPoint and web-based presentations etc. The teaching and learning materials are uploaded into a departmental server to provide a common module delivery file (MDF), which can be accessed by staff and students in different campuses. The arrangement is found effective as quality and consistency could be ensured. Students have benefited too as they could refer to the teaching and learning materials at their own pace and time to suit their learning pattern and ability. Staff members are also able to update or supplement additional teaching materials to suit the learning pattern of the students accordingly.

The second phase of implementation is to employ an IT platform for course management and effective communications with the students via the network. The department is in the process of adopting the WebCT for this purpose. It is anticipated that with the use of this software, more interactive and programmed learning could be achieved including on-line exercises, quizzes, discussion forums, student feedback etc. Staff members will be able to monitor the progress of individual students more closely and at the same time keep track of the in-course assessments more efficiently. The third phase of development involves extensive use of multimedia to enhance the teaching and learning materials. This is particularly useful and important for the type of students taking these courses, who are in general less academically inclined. With the use of multimedia presentations, involving animation and simulation in the course-wares whereever possible, students will have a much better understanding and interest in the learning process.

The use of IT for continuous professional development (CPD) is another top priority of this department. With the help of outside Internet providers, CPD could be effectively delivered to a much wider audience particularly for engineering professionals, due to their work nature and geographic location, who might have difficulties following a rigid time scheduled learning programme. Offering Internet or web-based CPD programme is definitely an excellent alternative.

PARTNERSHIP WITH INDUSTRY

To enhance vocational education, an important consideration must be given to establish a close relationship with industry. The department has in the past appointed industrial advisers to sit on advisory committees on different levels of course management. Additional input is also obtained through surveys, course validation, industrial visits and student projects etc. The commitments between academic institutes and industrial companies are usually rather lukewarm if not superficial, possibly due to a lack of interest or resources. At the least, as pointed out in Sargeant et al (1997), such a perception of an academic/industry gap should be narrowed.

To be able to respond to the fast changing competitive international market and new technology, there is now a much greater need for academic institutes and the industry to have a closer cooperation. To begin with, the local industry should be actively involved in designing the course curriculum particularly to match and to meet the industrial requirements in terms of knowledge, skills and relevance. Secondly, the industry should help to provide support for staff and student training, preferably also involved in the running of the courses. In this respect, staff and students will be able to focus the teaching and learning more towards the industrial environment and hence improve the employment prospects of our students. It is therefore logical for academic institutes to form partnership with industrial corporations, seeking mutual support and to share resources, which can be beneficial to both parties.

An example to illustrate the benefit of such industrial partnership could be demonstrated with the department's CAD/CAE Centre. The Centre is now equipped with the most advanced software packages for Computer Aided Design and Computer Aided Engineering. It is supported by local

industry from software suppliers and from industrial companies with the need of such technology. It is therefore logical to establish a partnership with these local companies to promote activities that are mutually beneficial to the department and the local industry. Industrial corporations wishing to participate are encouraged to set up their design office either physically or virtually with the department. A joint design office or centre is ideally set up to meet both the needs of the industry and the training requirement of our students possibly with shared resources and expertise. This will then help the department and the industrial companies to save on expensive software and hardware and at the same time to ensure that the department is equipped with the most appropriate design tools as required by industry standards. Alternatively design tools and technical information could also be made available in a virtual space in a PC server, which could be accessed by both parties. Such arrangements would help staff and students to have the opportunity to engage in a realistic engineering environment and to get involved directly with industrial projects. However, staff and students involvement in industrial projects of this nature must be recognized as part of their curriculum and course work. Their contribution should be credited as part of the teaching and learning exercise.

Another area of cooperation could be in the form of engineering knowledge database and CPD programmes. In an information age, knowledge database is vitally important to engineering professionals not only to deal with routine work but also to update on the latest development of technology. With the advent of Internet, there is great incentive for academics as well as industrial corporations to jointly establish such a facility to share technical information and to promote professional activities using web sites. It is feasible and desirable to setup a database as part of an Internet portal to provide a wider access to the engineering community. The department is therefore currently working with an Internet incubator venture company to provide Internet portal for the disciplines in Maritime Technology, Building Services, Environment and Safety. The web sites are also intended for web based CPD programmes for life-long learning.

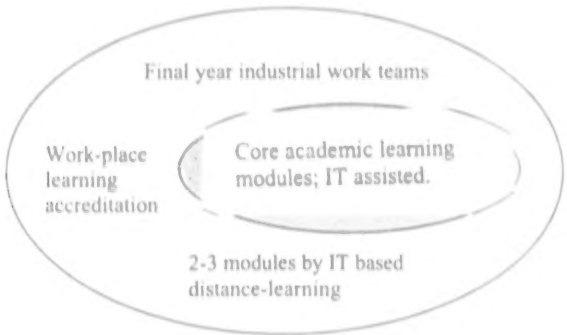
An Emerging Model

It is apparent from the preceding sections that to respond swiftly to market changes, the existing approach needs to operate differently and in particular, it should take advantage of IT. Industry or employers must be prepared to provide greater input, whilst a good balance of academic learning has to be kept. To develop the idea further, the boundary between academic institutions and the world of work would need to become more fluid and dynamic. It could be proposed further that an interface would be introduced in the final year of all courses, where project work with companies becomes the norm, whereby a lecturer/trainer would act as facilitator and lead students to solve problems for companies. It could also take the form of research and development for small firms, testing of equipment or system design. This would not only simulate the real work place, as it is the real work place. At the same time other qualities such as team work, communication and interpersonal skills development could be blended in too. The learning experience will not only be greatly enhanced, but also aligning to industrial needs.

In terms of IT application, it is to assist learning in core levels, then it is geared for distance-learning in the final year, where great flexibility to academic learning prepares for self-learning in the future. IT would also be used heavily for course administration in keeping track of progress of the diverse range of activities. A framework for this is depicted in Figure 1. To take advantage of this model further, a mechanism for accrediting work place learning should also be explored, for instance Wills(2000) offers some initial thoughts. As tomorrow's companies evolve, there would be a call for further innovation from vocational education providers. To nurture an innovative culture in a highly regulated sector, service providers could start experimenting with new ideas in continuing education,

which could take on many new forms that are discussed by Davis(1998). To be successful, another factor cannot be overlooked: a "national" accreditation/qualification scheme must be in place such that greater participation from potential learners would be assured of a nominal return at the least.

Figure 1: A conceptual framework for vocational education in engineering


Final year industrial work teams
Work-place learning accreditation
Core academic learning modules; IT assisted.
2-3 modules by IT based distance-learning

QUALITY ISSUES

Quality of teaching and quality assurance in further or higher education are complex issues even in the existing classical educational environment characterised by a structured, static and classroom format. These issues become much more complex due to the need to closely follow the rapid changes in engineering technology and in particular the explosive development of the information technology as an important teaching/learning tool.

In general, teaching staff should satisfy the requirements for academic qualifications in given area of specialism and also the increasing demands for appropriate academic/practical knowledge in teaching. In addition, the teaching staff in vocational education should have a very good and up-dated practical experience and knowledge in their own engineering field.

Furthermore, in the information age, lecturers must quickly acquire a good knowledge of IT and skills for its application. Lecturers need these capabilities in order to prepare modern sophisticated learning packages, deliver their teaching materials by the new means, interact and communicate effectively with their students and peers through the new medium, assess and follow student performance on-line, administer and manage the courses and regularly participate in life-long learning for their own continuous professional development. Their IT competency will no doubt become another crucial factor, together with the infrastructure and other resources, in providing quality teaching in the near future.

Quality assurance is another important quality issue. The courses in operation now in the department (and the similar courses to be offered in near future) follow the established VTC quality assurance system. It includes internal validation and external accreditation. In addition, it involves quality management that provides consistency, uniformity and commonality, documented activities, monitoring and follow up. However, learning new skills and acquiring new knowledge as stages of the life-long learning process impose very big challenges not only to the design of appropriate programmes and training of capable teachers but to the design and implementation of appropriate quality assurance system as well. The need to act quickly to the changing needs of the economy/industry and the use of IT with its flexibility and variety "*is likely to require a considerable*

measure of flexibility, adaptability, responsiveness and even fluidity that may be difficult to reconcile with the regulatory and standardising pressures that accompany qualifications frameworks".

The issue of the quality assurance framework is not an isolated concern that affects only this department. It is a "national" issue and the HKSAR will also have to address this topic including the reform of the education system and the definition of threshold achievement standards. In addition to such local quality assurance framework, input from international educational community will be bench-marked in order to provide reference for quality vocational programmes and training.

CONCLUDING REMARKS

This paper describes the efforts and aspiration of an engineering department that is proactively keeping apace with the fast changing operating environment. It seeks to move from a traditional product-oriented and supply-driven service provision to developing courses around customer requirements through partnership with employers, the key stakeholder to system output. Under this new approach, information technology is seen as an enabling tool that would greatly enhance the department's capability and service provision. A successful transformation would form a strong basis for expanding into continuing education services as life-long learning gathers momentum.

To adapt closely to the changing environment, efforts by service providers and employers alone cannot bring about transformation or even significant changes. Major stakeholders, such as policy-maker and regulatory bodies should be equally innovative in their approach, creating flexible systems that current operating environment entails if vocational education is not to lag behind technological or economic developments. In short, the main task ahead is for the department to close the academic/industry gap, adding genuine value to its stakeholders.

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THE ENGINEERING GRADUATE TRAINING SCHEME AND NEW TECHNOLOGY TRAINING SCHEME IN HONG KONG

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Abstract: If Hong Kong is to improve its competitiveness, a sustainable adequate supply of well-educated and trained manpower, particularly at the technologist level, is essential. Given the fact that human capital is the single most important factor supporting Hong Kong's development, the Hong Kong Government has been and will continue to be firmly committed to investing heavily in education and training. This paper describes the operation of two government funded schemes for training technologists in Hong Kong , namely the Engineering Graduate Training Scheme (EGTS) and the New Technology Training Scheme which are administered by the Committee on Technologist Training of the Vocational Training Council(VTC).

INTRODUCTION

The story of Hong Kong is well-known. Its change from being a small barren island, totally devoid of natural resources, to being first an entrepot and then a robust manufacturing, trading and financial centre, despite numerous political, social and economic upheavals, is well documented. What is not so well-known, however, is the efforts made by Hong Kong in developing a system of technical education and industrial training that has helped to make some of these changes possible, a system that is designed to meet the specific needs of the economy and seeks to match output of trained personnel with the economy's requirements. People were, and are still, Hong Kong's only natural resources. For this very reason, the quality of our people has a direct bearing on Hong Kong's competitiveness in the world. If Hong Kong is to improve its competitiveness, a sustainable adequate supply of well-educated and trained manpower, particularly at the technologist level, is essential. Given the fact that human capital is the single most important factor supporting Hong Kong's development, the Hong Kong Government has been and will continue to be firmly committed to investing heavily in education and training. The important development of the manpower training services in Hong Kong has included the set up of the Vocational Training Council (VTC) in 1982 which is responsible for, amongst many other things, instituting, developing and operating schemes for training operatives, craftsmen, technicians and technologists.

In the context of training at technologist level in Hong Kong, the main role of the universities is to provide education to first degree level and beyond. Post-graduate practical training is necessary for engineering graduates to integrate 'theory' with 'practice' so that they can develop and take up competently the responsibilities and role as a professional engineer in industry. However, employers are often reluctant to provide comprehensive practical training for engineering graduates knowing that the cost of initial training of engineers is high and there is no certainty that the engineer will remain with the employer after the training. In recognition of the increasing difficulty of Hong Kong engineering graduates in getting practical training in industry and of the

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need for assisting employers, particularly in the manufacturing sector, to make good the high initial cost of training engineers, the VTC launched the Engineering Graduate Training Scheme (EGTS) in 1983.

The Engineering Graduate Training Scheme (EGTS)

The objective of the EGTS is to assist engineering graduates to find positions with firms which could provide them with the range of training activities and experience necessary to achieve professional status. The EGTS achieves its goal in bringing about more practical training opportunities for engineering graduates by providing a financial incentive to employers to start and if possible to train more engineering graduates. The Hong Kong Government provides the funding for the EGTS through annual grants allocated to the VTC.

The EGTS is operated by the Committee on Technologist Training (CTT) of the VTC in conjunction with the Hong Kong Institution of Engineers (HKIE) with the former responsible for the administration of the Scheme and the latter standards setting and assessment. The HKIE was incorporated by a Government Ordinance in 1975. Since then, corporate membership of HKIE has been the primary qualification for employment as a qualified professional engineer in Hong Kong. The HKIE has a Graduate Training Scheme 'A' for training professional engineers. It is a comprehensive and well-structured training system aiming at fostering the development of engineering graduates in those technical and professional matters perceived to be required by a professional engineer. The normal training period of Scheme 'A'; is 3 years for Civil, Structural, Geotechnical and Environmental Engineering disciplines while 2 years for all the other engineering disciplines. The Scheme 'A' also provides the fastest route for engineering graduates to attain Corporate Membership of the HKIE. The HKIE has set out Model Training Guides for all the 16 engineering disciplines to assist companies in setting up training programmes for registration under its Scheme 'A' training.

To assist it in administering the EGTS, the CTT set up the Sub-Committee on EGTS. The membership of the CTT and the Sub-Committee on EGTS includes representatives from employers, employers' associations, tertiary institutions, industry-support organisations, HKIE and relevant Government departments; with the majority of members from industry.

Eligibility for the EGTS

Any employer in Hong Kong wishing to provide his graduate trainees with practical training of a standard acceptable for corporate membership of the HKIE is eligible for EGTS training subsidy. To meet the high cost of initial training, each graduate trainee undertaking the EGTS training is granted a subsidy from the Government for a period up to a maximum of 18 months. The subsidy is paid through the trainee's employer as part of his salary and is subject to annual review by the CTT against the salary trend. The present rate of subsidy is HK$5,885 per month per graduate trainee. There are about 300 training places provided annually under the EGTS.

Under the EGTS, practical training is provided by employers of the graduate trainees. Training programmes of participating firms must first be approved by the HKIE before they could be registered with the VTC for EGTS training. Employers' applications will be approved by the Sub-Committee on EGTS. The Technologist Training Unit of the VTC is the executive arm of the CTT. Apart from the day-to-day administration of the EGTS, the Unit operates a free service to assist employers in dealing with the training of engineering trainees and the EGTS. The Industrial Training Officers of the Unit may, upon request, assist employers in drawing up detailed training programmes and training supervision arrangements for submission to the HKIE for approval. The Unit also operates a free graduate placement service to help participating firms to recruit graduates

trainees for EGTS training.

Engineering graduates of local or overseas universities who are Hong Kong permanent residents and possessing an engineering qualification acceptable for the Corporate Membership of the HKIE are eligible to join the EGTS.

Recruitment of Trainees for EGTS Training

At the beginning of each year, EGTS participating firms are invited to indicate the number of engineering graduates they wish to recruit within the forthcoming financial year. The Sub-Committee on EGTS has devised criteria for the equitable allocation of subsidized training places to EGTS participating firms. Employers will be advised of the number of allocated training places in May so that they could proceed the recruitment of engineering graduates for EGTS training. Employers having difficulties in recruiting fresh graduates may approach the VTC's Technologist Training Unit for help in recruitment. The following conditions have also to be met before an application for EGTS subsidy submitted by an employer could be approved:

i) The allocated training places should normally be filled by fresh graduates (i.e. graduating within the financial year)

ii) In disciplines other than Civil, Structural, Environmental & Geotechnical Engineering, trainees should normally have completed an approved basic training course.

iii) Recruitment should be completed within 6 months of receipt of the approval of recruitment.

Employers may recruit overseas graduates without approved basic training provided that they agree to release these graduate trainees for basic training in VTC training centres. Provision of basic training to these graduate trainees by the VTC is free on the condition that employers are required to pay the normal salaries to these trainees for the whole basic training period.

Monitoring of EGTS Trainees' Training Progress

The training of each trainee under the EGTS is closely monitored by the CTT through the trainee's Engineering Supervisor. Engineering Supervisors must be Corporate Members of the HKIE in the same discipline as the trainee's and hold a responsible position in the organisation providing the training. As Engineering Supervisor is the defecto representative of the HKIE in the organisation, the appointment has to be approval by the HKIE. In organisations where suitable Engineering Supervisors are not available, the CTT will assist such employers in finding External Engineering Supervisors whose service is voluntary.

An Engineering Supervisor is required to

i) ensure that the trainee receives training in accordance with the approved training programme,

ii) be available to the trainee to discuss training, technical and professional matters.

iii) verify and endorse the trainee's HKIE training log book for submission to the CTT; and

iv) conduct formal meetings with the trainee to assess his progress.

Throughout the entire training period, trainees are required to maintain HKIE training log books. For the purpose of subsidy payment, employers are required to submit to the CTT copies of their trainees' HKIE log books on a quarterly basis for inspection by the Industrial Training Officers (ITOs) of the VTC.

Apart from the firm's internal arrangement for monitoring the training progress of EGTS trainees, the ITOs of the VTC will also interview EGTS trainees during their subsidized period to check their progress and HKIE training log books.

On satisfactory completion of the EGTS training, employers are required to submit to the CTT a final training report of each trainee covering the entire EGTS training for the issue of Certificate of Completion of Post-graduate Training to the trainee.

When the EGTS was first introduced in 1983, it accepted only those training programmes approved by the HKIE under Scheme 'A' training. In order to provide more training places under the EGTS, with effect from 1.1.1985, it had been expanded to cover also training programmes approved by some of the professional engineering institutions in the UK. The CTT accepted these institutions as they did approve overseas training programmes and their corporate membership was fully recognised by the Hong Kong Government. However, in view of the substantial increase in the number of firms having HKIE approved training programmes, the CTT decided that commencing 1995, priority be accorded to training prgrammes administered by the HKIE when allocating training places to EGTS participating firms.

Following the decision of the HKIE to accept firms' training programmes with training wholly or partly conducted in Mainland China under Scheme 'A', the scope of the EGTS was expanded in August 1992 to accept these training programmes.

The CTT has regularly reviewed the scope of the EGTS to include new engineering disciplines to meet the industry needs. At present, all the 16 engineering disciplines under HKIE Scheme 'A' have been included in the EGTS.

As at 31.5.2000, a total number of 385 training programmes from about 230 companies have been approved under the EGTS. Some 3945 graduate and 310 sandwich trainees have been subsidised since the launch of the EGTS in 1983. Among them, 3084 graduate trainees have completed their EGTS training. At present, there are 384 graduate and 5 sandwich trainees still undertaking the EGTS training. The distribution of these past EGTS graduate trainees by their engineering disciplines is shown in Appendix 1. Appendix 2 shows the distribution of the EGTS graduate training places by engineering disciplines allocated to participating firms for the past five years. Appendix 3 shows the trend of the EGTS subsidy as percentage of the graduate trainees' weighted average monthly salary as proposed by their employers for the last 5 years.

New Technology Training Scheme (NTTS)

The restructuring of Hong Kong's economy over the past decade witnesses its development into a knowledge-driven and technology intensive economy. In this fast-changing, knowledge-based economy where new skill requirements emerge rapidly, it is important for those already in work to improve their knowledge and skills. For this reason, the Hong Kong Government has been taking an active role in helping employers in acquiring new technologies as well as in promoting a culture of life-long learning among the workforce in collaboration with tertiary education institutions, industry-support organizations and industry. This life-long learning is particularly important for our engineers who are expected to be able to master technological advances and to put them to good profitable use by their employers. It is against this background, the VTC launched the New Technology Training Scheme (NTTS) in June 1992.

The NTTS is administered by the Committee on Technologist Training (CTT) of the VTC. To assist it in administering the NTTS, the CTT set up the Sub-Committee on Training in New Technologies. The purpose of the NTTS is to provide financial assistance to employers wishing to have their staff trained in new technologies which would be beneficial to Hong Kong. In the context of the NTTS, new technologies include those which are either new or not widely applied in

Hong Kong and the absorption and application of which would significantly benefit Hong Kong. The NTTS is financed by the income earned from the investment of the New Technology Training Fund set up under trust on behalf of the Hong Kong Government.

In view of the rather lukewarm response from employers in the first few years, the Government, on the recommendation of the VTC, approved the implementation of the following improvement measures to enhance the attractiveness of the NTTS in February 1997:

i) to raise the level of grant from 50% to 75% of the total cost of training incurred by an applicant;

ii) to remove the grant ceilings of $37,500 per trainee for overseas training and $15,000 per trainee for local training; and

iii) to extend assistance to other forms of training including tailor-made local training courses for individual companies if they meet the NTTS's objectives; and

iv) to further promote the NTTS and make it clear that the NTTS covers not only the manufacturing industries but also the service industries.

Types and Amount of Training Grant

Under the NTTS, there are three kinds of training grant:

Type A - Overseas training courses or work attachments.

The training cost may cover:

i) A return air passage to the overseas facility by the most economical and convenient means;

ii) A reasonable subsistence allowance for the duration of training at the overseas facility;

iii) Training expenses including course fee and course materials etc.;

iv) Any other fees charged by agencies responsible for identifying the placement concerned.

The training grant can be up to 75% of the total training cost.

Type B - Local training courses or work attachments. The training grant can be up to 75% of the training cost which will only cover the course fee.

Type C - Tailor-made training courses for individual company.

Employer may apply for grants to bring in overseas trainers to conduct training courses locally or engage training organisations or higher education institutions to organise tailor-made training courses to suit their needs. If overseas trainers are brought into Hong Kong, the grant will also cover a return air passage, a reasonable subsistence allowance and the professional fee charged by the overseas trainers if they are not brought in from the applying company's parent or subsidiary company.

Eligibility for the Scheme

A company in Hong Kong wishing to have its staff trained in a new technology for commercial application may apply for a training grant. The company must be a non-government or a non-government subvented organisation. Furthermore, the trainee must

(i) be a permanent resident of Hong Kong,

(ii) have the necessary education/experience to benefit from the training, and

(iii) be company-sponsored.

Approval of Applications

Each application will be considered based mainly on whether the absorption and application of the new technology concerned will benefit Hong Kong. To this end, the Sub-Committee on Training in New Technologies has laid down stringent criteria for assessing the suitability of training courses to ensure that the application of the new technologies concerned will benefit employers in improving efficiency, productivity and quality. The general approval criteria are:

(i) the technology should be new or has not been widely used and would benefit the local economic sector;

(ii) the employer and the trainee can benefit from the proposed training;

(iii) the quality of the training programme;

(iv) the course content should include application of the technology concerned, case studies and other practical elements to effect technology transfer.

For tailor-made training courses for individual company, an applying company is further required to provide the following information:

(i) the reasons why the proposed training could not be obtained through attending existing courses provided by local course providers;

(ii) the objective and the relevance of the proposed training to the company's needs;

(iii) the company's plan of using the knowledge and skills acquired by the trainees;

(iv) the company's plan for diffusion of the proposed technology by the trainees to other workers of the company; and

(v) the detailed implementation schedule of the acquired technology by the company.

These criteria are regularly reviewed by the Sub-Committee to ensure that they are adequate and appropriate in meeting the objective of the NTTS.

The Sub-Committee has maintained an Indicative List of New Technologies which serves as an internal reference for vetting and approving applications submitted under the NTTS. In most cases, the Sub-Committee also seeks outside expert advice from local tertiary institutions and the interested parties on the relevancy and appropriateness of the applications submitted. The Indicative List is regularly updated through VTC's training boards and general committees and the Industry and Technology Development Council to take into account the latest technological developments. Furthermore, to help Hong Kong's small-and-medium enterprises (SMEs) make better use of the NTTS, these training boards/committees are requested in the course of updating the List to give thought to those current technologies which are not yet widely applied in SMEs. The List will also be sent to the Small and Medium Enterprises Committee of the Industry Department for comments so that technologies which have not yet been widely applied amongst SMEs will be included.

Since its inception in June 1992 and up to 15 June 2000, there have been a total of 8,773 applications approved under the NTTS involving training grants of a value of some HK41 million. A breakdown of the approved applications for NTTS training grant by types of training is as follows:

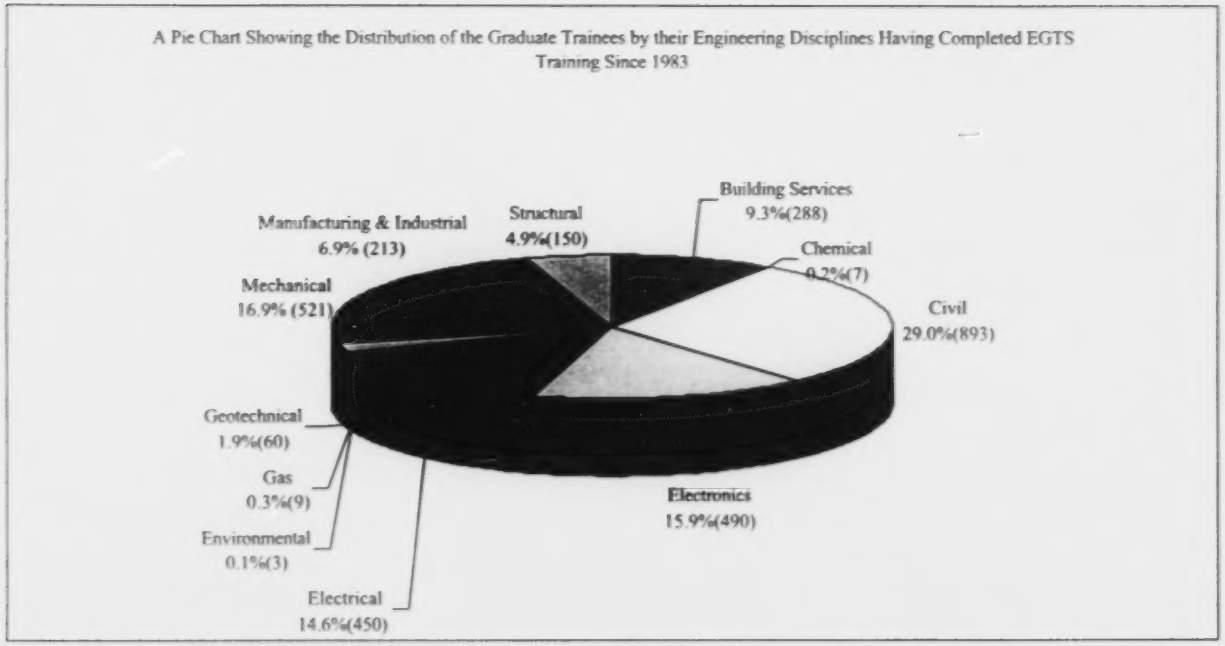
Type of Training Courses	Total No. of Trainees Approved for Training
Local	7228 (82.4%)
Overseas	471 (5.4%
Tailor-made	1074 (12.2%)
Total	**8773 (100%)**

CONCLUSION

Technology and innovation will be the driving forces for sustained economic growth as well as the basis for Hong Kong to compete successfully in the global marketplace. The Hong Kong Government is determined to turn Hong Kong into a knowledge-based economy and dedicated to enhancing the innovation and technology capacity of the private sector. Given the fact that human capital is the single most important factor supporting Hong Kong's development, the Hong Kong Government will endeavor to ensure the availability of a continuing and adequate supply of well-educated and well-trained manpower , particularly at the technologist level , that has the ability to cope with the changing needs of the technological advances. In this connection , the EGTS and the NTTS have been playing a vital role in assisting the Hong Kong Government to accomplish its commitment to making Hong Kong a centre of innovation and technology . This is because through the funding support under the EGTS, employers are willing to provide their graduate trainees with an all-round training hereby ensuing the availability of a pool of well-trained professional engineers in Hong Kong. Likewise, the NTTS has achieved its objective as not only training courses approved under the Scheme will benefit the local industry by bringing in new technologies , but also the Scheme has provided employers, particularly the SMEs, the impetus needed to send their staff for training in new technologies.

APPENDIX I

Building Services	288
Chemical	7
Civil	893
Electronics	490
Electrical	450
Environmental	3
Gas	9
Geotechnical	60
Mechanical	521
Manufacturing & Industria	213
Structural	150
Total	3084



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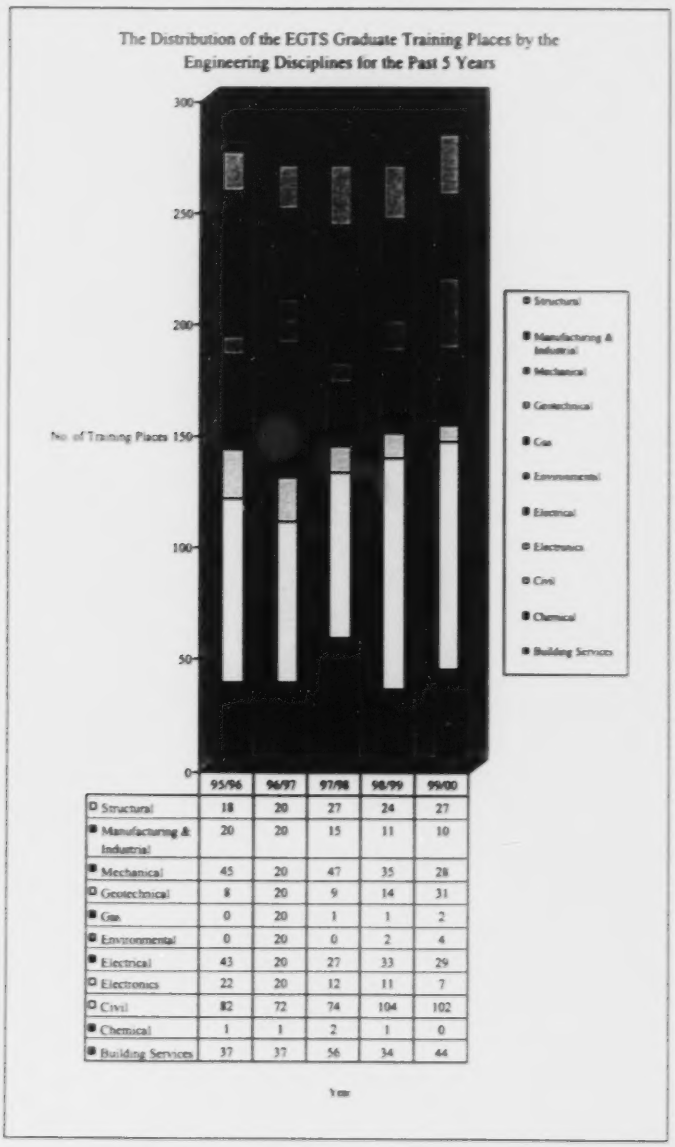
APPENDIX II

Year	95/96	96/97	97/98	98/99	99/00
Building Services	37	37	56	34	44
Chemical	1	1	2	1	0
Civil	82	72	74	104	102
Electronics	22	20	12	11	7
Electrical	43	20	27	33	29
Environmental	0	20	0	2	4
Gas	0	20	1	1	2
Geotechnical	8	20	9	14	31
Mechanical	45	20	47	35	28
Manufacturing & Industrial	20	20	15	11	10
Structural	18	20	27	24	27
Total	276	20	270	270	284



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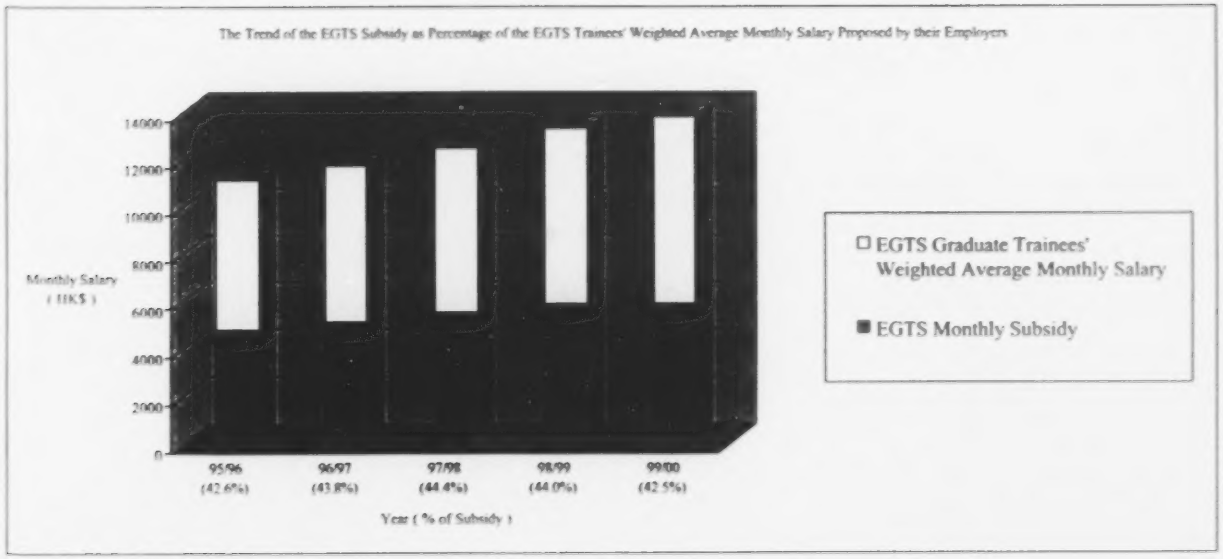
APPENDIX III

Year	EGTS Monthly Subsidy	EGTS Graduate Trainees' Weighted Average Monthly Salary	Total Salary	%
95/96 (42.6%)	4750	6401	11151	42.6
96/97 (43.8%)	5150	6621	11771	43.8
97/98 (44.4%)	5550	6949	12499	44.4
98/99 (44.0%)	5885	7489	13374	44.0
99/00 (42.5%)	5885	7952	13837	42.5



DEVELOPING A COMPETITIVE PROGRAM TO COPE WITH THE 3C(CHANGE, COMPETITIVE, COMPLEX) TREND IN INDUSTRY

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Index: Competitive advantage, Performance of manpower, Training and development, Training program, Training curriculum, Employee development

Abstract: Facing the 3C trend – **C**hange rapidly, more **C**ompetitive, highly **C**omplex in the industry, it is important issue that how organization can anticipate the tendency for the business, cope with violent change in the fast pace, and take a proactive & strategic action to achieve the competitive advantages. The purpose of this study indicates the program setting designed for different employee according to different requirement and characteristics of job.

It is apparent that keeping capability growth and progress in the performance of manpower and achievement of operating profit which depend both on the development of individual employee and whole organization.

By the serial planed program and curriculum for human resource development, all employees will get a set of "ability diagnosis" first, and then take a drafted program suite for the individual. Obviously, the advantage of competition for organization emphasize on the promotion of the competency for his individual from top to bottom in company.

In the paper, it will explore a programming plan and demonstrate a set of curriculums in a practical example to expose how to design and implement a program for competent manpower.

INTRODUCTION

We know that any organizational training strategy based on prescriptions depending on the sector, product, service and workforce expectation of the organization concerned. Training and development activities would deliver the required knowledge, skills and attitude to fit the achievement of corporate object. And it would be seen as a vital factor influencing the operational performance of organization.

We know the contribution of employee development is

- The highlights of the contribution made by training
- To link with the total strategy containing marking, product engineering, manufacturing systems engineering and business systems

- To evidence the top- management commitment
- To play the role in developing the competitive achievement plans
- To underpin business task forces

How to combine the training and performance?

Organizations have the viewpoint of recognizing that the training and development is a strategic priority rather than a tactical response.

Figure1 How to plan a strategic training and development

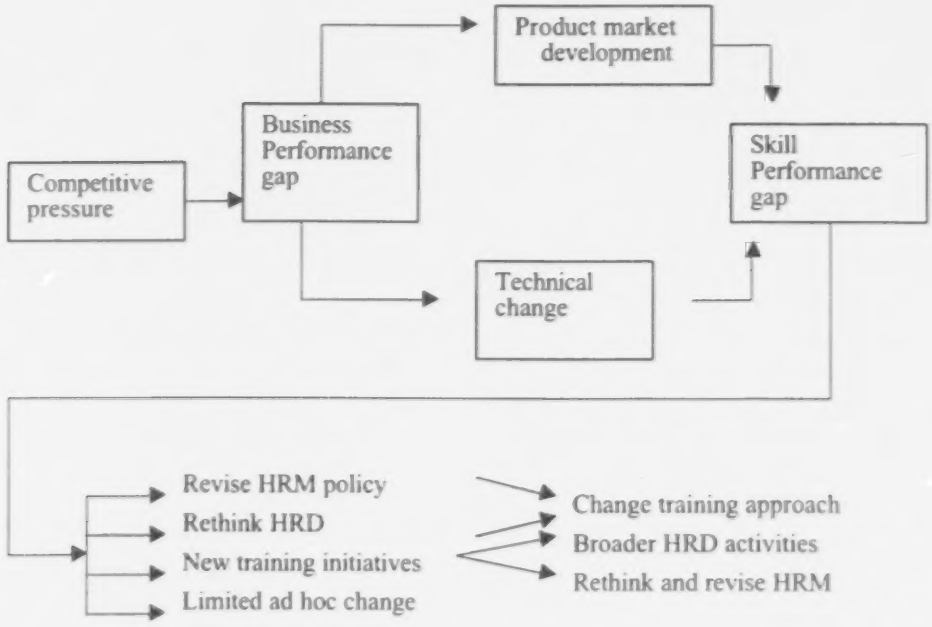
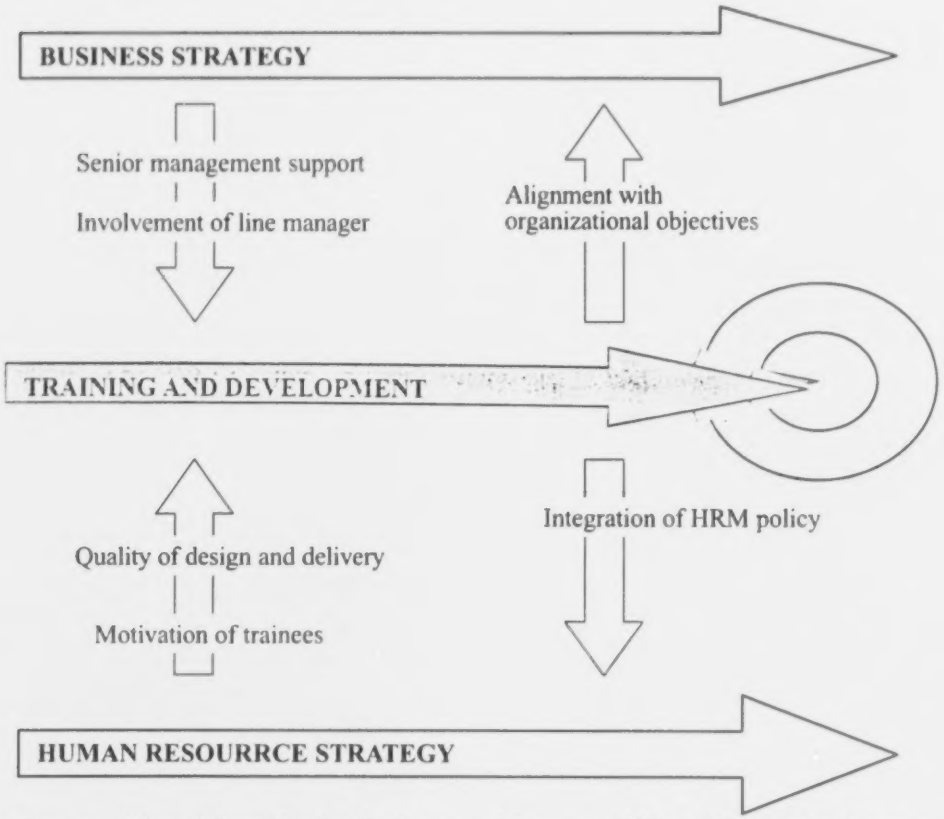


Figure2 Links between business performance and human resource responses



Source: Adapted from Hendry, Pettigrew and Sparrow, 1988, p. 41The strategic purpose of training and development.

The manpower development plan mean that corporate attempt to revise overall human resource management, and to embrace such things as recruitment, reward schemes, reducing attrition, enhancing accountability.

Another strategic purpose of training and development is to play as a catalyst for change. To fit the purpose, we need to take account of

- the quality of training
- the context of training
- the scope of training

It is easy to change external manifestations of culture; and it is far more ambitious to change the ingrained attitudes and norms for employees. What important is the way management development: not only upgrade skills but also to structure attitude.

The third purpose of training and development is an endeavor to get the organizational competitive edge, by the means of the content of activities and the way delivered. More and more organizations practice human resource strategy as a approach of integrating their business plan with organizational development.

The forth purpose of training and development is to encourage a learning climate in the organization. The focus is on the learning needs of employees, directed by organizational goals. The training approach is away from structured, taught courses, but tend to enhanced opportunities for self-development.

The essence of training needs is a comparison between what is and what should be. Instruction is a way of narrowing the gap between condition and criterion when the deficiency is caused by lack of knowledge or skill.

Some data collection methods can be used to contrast condition and criteria for training needs assessment, including: (1)interview, (2)survey, (3)observation, (4)task analysis, (5)performance evaluation, (6)assessment center, (7)group discussion, (8)critical incident techniques, (9)delphi procedure, (10)nominal group techniques.

Analysis of functional strengths and weaknesses provides insight into what contribution should be making to corporation, what resource should receive. The analysis of past or present strengths and weaknesses is not sufficient for meeting future learning needs. Future analysis is necessary and essential.

The following chart demonstrates the key factors considered for instructional needs assessment of corporation.

Figure3 Instructional needs assessment

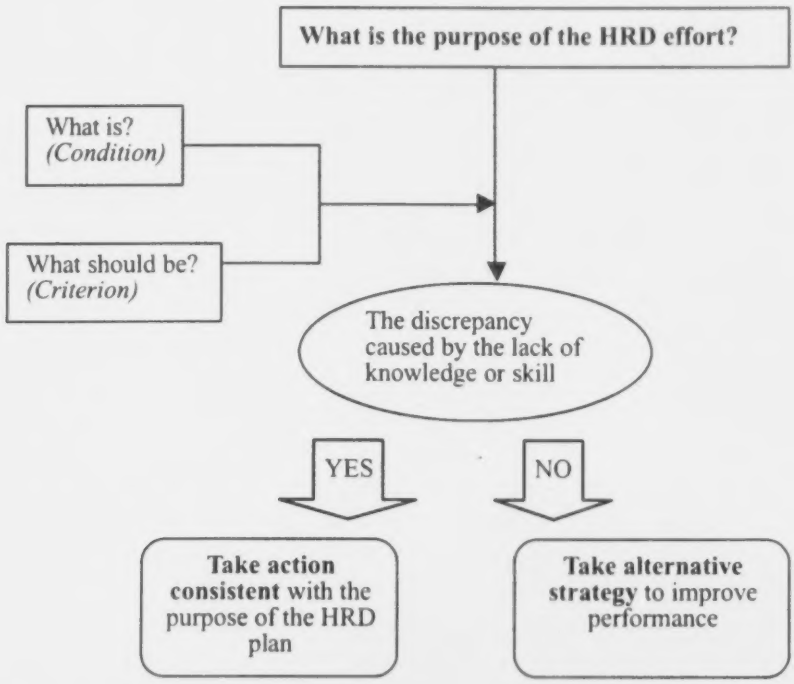

What is the purpose of the HRD effort?
What is? (Condition)
What should be? (Criterion)
The discrepancy caused by the lack of knowledge or skill
YES
NO
Take action consistent with the purpose of the HRD plan
Take alternative strategy to improve performance

Figure4 Linking employee development and organizational mission

Source: Christopher Mabey, and Graeme Salaman(1995), *Strategic Human Resource Management*

Figure5 The practical implement for employee development

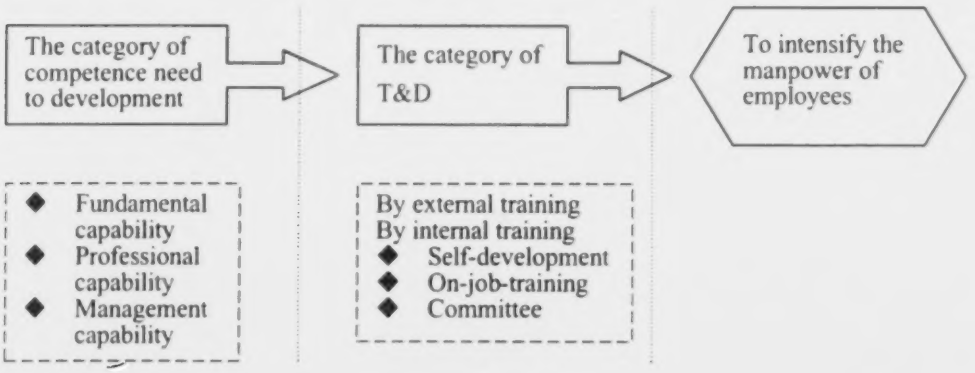
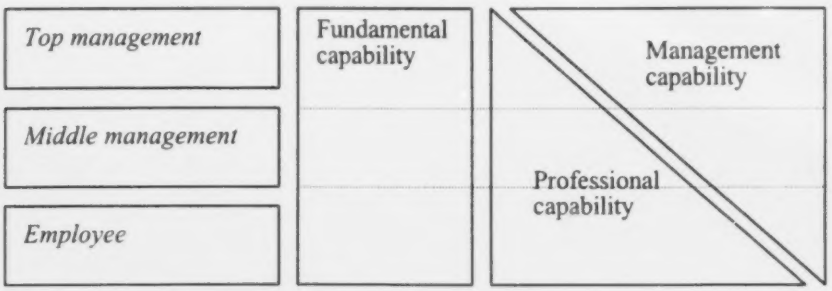


Figure6 The capability category for employee development



The transformative environment

In the past decade, many organizations altered the way they operate their environment. Increased competition impelled many corporations to downsize, more efficient, and flexible, and pushed corporations to proactive the tendency of 3C.

Organizational transformation implies radical changes in how they perceive, think, and behave.

We are concerned with the assumptions underlying how the organization relates to its environment and shifts to its business operational philosophy. The effective training and development would reflect both the trategic priorities of the business as well as the aspirations of the individuals.

CONCLUSION

There are an explicit attempt to match the business plan and employee management at all business level. Training and development program provide the vital linkage between corporate strategy and HRD policies.

To enhance the capability of training function, we should internalize and integrate the knowledge supplying by external expert. By means of those steps described in forward content, we could craft and design a competitive program to proactive the needs of employee development and to meet the path of corporate development, as well as response to the tendency of transformative environment.

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HOW EFFECTIVE ARE OUR TEACHING METHODS FOR VOCATIONAL EDUCATION

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Keywords: Attitude, affective domain; questionnaires; experimental research

Abstract : In vocational education, students' attitudes are often overlooked in its pedagogy deployment. The theme of this paper is to investigate how to measure the effectiveness of teaching in student's affective domain.

The research experiment was designed with time-span of 15 weeks. A set of questionnaires was designed as the instrument of the investigation. Prior to the experiment, students were split into two groups. Subsequently, these two groups of students went through different approaches of teaching. At the end of the experiment, the same questionnaires were used to probe students' attitude. Data analysis was used to measure the shift of attitude before and after the experiment of these two groups of students.

Apparently, one group of students has more positive attitude. However, data analysis shows we cannot conclude it was caused solely by imposing one particular teaching method. Likewise, even with the fact that many students of the experimental group favored one particular type of teaching method, there is no evidence that this teaching method can have higher impact in students' attitude. This study provides a useful viewpoint in the planning and evaluation when conducting a novel teaching methodology.

1. Background of teaching and learning in HKIVE

The Department of Electrical & Communications Engineering (Dept. of EE) at Hong Kong Institute of Vocational Education (HKIVE) has offered several Higher Diploma courses since the opening of the Hong Kong Technical College (now as HKIVE) in 1993. Conventional lectures and tutorials are the major means of these taught courses. In many lectures, class-size of 80 students is common. In some cases, there are lectures with as many as 160 students.

In this type of teaching, lecturers are the only people who do most of the talking in lecture theatres. In fact, many students feel bored in this type of one-way communication. In many cases, students have expressed strong resentment. It was felt that some alternatives might be used to enhance the learning outcome of the students at HKIVE(TY).

2. Lab-based teaching

Over the past decade, teaching methods in the courses that involve engineering disciplines have evolved significantly beyond the "lecture & laboratory" format. Experience has shown that, for effective teaching of many science and engineering subjects, practical exercises in the form of laboratory exercises need to be an integral part of the courses [1,2,3]. In particular, computer usage in the laboratory and computer-assisted homework has been very successful. Students have found that learning difficult concepts can be done more effectively when those concepts can be presented and explored visually or in a form for experimentation.

Laboratory approach teaching seems to be the natural alternative. Essentially, lab-based teaching makes use of a heuristic approach to learning which advocates "I see – I forget; I hear – I remember; I do – I understand". Learning by doing is a common teaching and learning method: "active learning" is an essential part of student-centered learning [4]. To make the coordination between the practical and theoretical work better, it is believed that lab-based teaching can provide the integration and it can deliver as part of the course plan. In this way, lab-based class can well integrated according to an overall course plan.

The activities of lab-based teaching/learning are largely student-based and monitored by instructors. It also emphasized small group teaching and learning in which students are encouraged to organize their thinking by comparing ideas and interpretations with each other and to give expression, and hence form, to their understanding of a subject. The role of the lecturer/instructor seems to be particularly critical in the lab-based teaching.

Using lab-based approach to teaching, students spend a considerable proportion of their time in the laboratory. During the exercise, it is effective for students to establish a positive attitude toward their professional in an environment similar to that of their future workplace.

3. Questionnaires – measurement of attitudes

In vocational education, students' attitudes are often overlooked in its pedagogy deployment. The theme of this paper is to investigate the effectiveness of teaching in student's affective domain by comparing the shift of attitude of two groups of students. The overall design of the experiment consists of the following steps and it can be depicted in Figure 1[5,6].

	Time →	→	→
Group under investigation	T1	*X*	T2
Control Group	T1	*Y*	T2

Where T1 : Questionnaires administrated to all students
T2 : Questionnaires administrated to all students
X : lab-based teaching
Y : conventional teaching

***Figure 1**: Overall design methodology*

Questionnaires are the principal instruments used in attitude measurement. The measurement of attitude can be done by the levels of agreement with a series of statement are combined to give an attitude score.

4. Likert scale

In constructing a questionnaire, one wants to use scales at the *interval* level or at least *ordinal* level whenever possible[7,8]. All of the more powerful techniques of statistical analysis demand such scales, rather than simple *nominal* measures. One of the most frequently used ordinal-type scales is a single item (question) on a Likert-type scale. A Likert-type item consists of a single statement, followed by a usually five-point choice with each choice described in words. A common response in Likert-type scale are choices from Strongly Agree (SA), Agree (A), Uncertain (U), Dis-agree (D) and Strongly Disagree (SD). These responses are mapped with score from 1 to 5. Respondents are presented with questionnaires in which they use a choice to indicate how well the choice matches their feeling about the concepts. The measurement of attitudes is usually based on a form of attitude

scale which levels of agreement with a series of statements are combined to give an attitude score. That is, the total attitude score is the **sum** of the individual question scores.

5. Design of questionnaires

It is desirable to know whether there is shift of attitude toward two main concepts: "engineering lesson in HKTC" and "engineering as a profession". Subsequently, a questionnaire with 26 questions was designed to probe the students' attitudes towards these two concepts. The questionnaires consist of two sections. The first section is attitude toward engineering lesson at HKTC. Student's attitude is measured with a set of 11 questions. These questions are measured in Likert-type scale and they are corresponding to a 5-point scale. The attitude score is the total of these responses. As shown in Figure 2, 11 items with Likert-type scale are used and sample's scoring of each question in tallying the composite attitude score. A problem with the Likert technique is the modest attitude score can be obtained by many patterns of response such as giving middle scores on all items. In constructing Likert-type and similar scales, some of the items should be positive and others should be negative. It is used to avoid "response-set". Noted that four of them are negative questions and they are marked with asterisks.

1. There is usually sufficient equipment and materials
2. Students put a lot of effort into what they do
3. The lectures lessons are well organized
4. The tutorial lessons are well organized
5. The laboratory lessons are well organized
6. Student waste time doing nothing in laboratory (*)
7. Most students really pay attention to what the lecturer says
8. Very few students take part in class discussions (*)
9. Student don't do much work in lab (*)
10. Because equipment is scarce, students don't get much practical work completed (*)
11. Student really enjoy their lessons

***Figure 2**: Questionnaires to probe students' concept of a engineering lessons at HKTC. (note : questions in asterisk are negative questions); Answer with choices of SD, D, N, A, SA.*

The second section is to measure their attitude toward engineering as profession. A total of 15 questions are asked in *semantic differential* scale from 1 to 5 and details are shown in Figure 3. The first survey was done before the experiment. Another survey with the same questionnaire was carried out to identify any change of attitudes from these two groups of students.

A job working in Communications Engineering Area is						
Interesting	1	2	3	4	5	Boring
Make you tense	1	2	3	4	5	Make you relaxed
Successful	1	2	3	4	5	Unsuccessful
Unfriendly	1	2	3	4	5	Friendly
Modern	1	2	3	4	5	Out-of-date
Safe	1	2	3	4	5	Risky
Difficult	1	2	3	4	5	Easy
Requires work in a team	1	2	3	4	5	No team work required
Demanding	1	2	3	4	5	Undemanding
Requires much experience	1	2	3	4	5	Requires no experience
Technical	1	2	3	4	5	Non-technical
Non-specialized	1	2	3	4	5	Specialized
Active	1	2	3	4	5	Passive
Useful to others	1	2	3	4	5	Not useful to others
Involves much responsibility	1	2	3	4	5	Involve little responsibility

Figure 3: Questionnaires to probe students' concept of a job working in communications engineering area.

6. Summary of results

The first part of the questionnaires concerned with students' perceptions in the matters of engineering lesson. The summation of 11 scores of Likert scales to make up a "attitude score". After the completion of the experiment, as shown in Table 1, we can observe that attitude score of experiment group (Group B) changed from 33.83 to 35.58 while the control group's attitude score changed from 31.33 to 32.67. Details of the data analysis indicated the significance of these are 0.166 and 0.533. This means that there is a high chance that pretest and posttest attitude score are effectively equal.

Likert scale	control		experimental		t-value	2-tail significance
	mean	std	mean	std		
pretest (1,2)	31.3333	4.416	33.8333	2.368	-1.68	0.110
posttest (3,4)	32.6667	4.472	35.5833	3.502	-1.68	0.110

***Table 1**: Summary of data analysis (comparing the effect of the treatment)*

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In the second part of the questionnaires, another 15 questions were used to probe students' attitudes toward engineering as a profession. Data analysis was carried out to test whether there is a shift of attitude after the experiment and the results are shown in Table 2. Although each question uses the same semantic differential scale, they represent different concepts. Thus, the data from each of the 15 questions are analyzed separately. In this analysis, *t*-test was carried out to test whether there was shift of attitude toward engineering as a profession. The lowest probability value from these evaluations is 0.075. None of these has a 2-tail significance lower than 0.01 (i.e. $p > 0.01$). It was concluded that there were no significant differences in students' attitude after the experiment.

Question	Pretest		Posttest		t-value	2-tail significance
	Mean	STD	Mean	STD		(p)
Q12	2.8333	0.718	2.7500	0.622	0.30	0.764
Q13	2.4167	0.515	2.8333	0.577	-1.87	0.075
Q14	2.6667	0.778	2.8333	0.577	-0.60	0.557
Q15	3.6667	0.651	3.0000	0.853	2.15	0.043
Q16	2.9167	0.669	2.4167	0.793	1.67	0.109
Q17	2.2500	0.754	0.2533	0.669	-1.15	0.264
Q18	2.6667	0.778	2.7500	0.452	-0.32	0.752
Q18	2.6667	0.778	2.7500	0.452	-0.32	0.752
Q19	2.3333	0.651	2.3333	0.651	0.0	1.00
Q20	2.7500	0.754	2.5000	0.522	0.94	0.355
Q21	2.7500	0.754	2.4167	0.669	1.15	0.264
Q22	2.6667	0.888	2.5000	0.522	0.56	0.581
Q23	3.0000	0.426	3.1667	0.718	-0.69	0.496
Q24	2.5833	0.669	2.6667	0.651	-0.31	0.760
Q25	3.0000	0.426	2.7500	0.622	1.15	0.263
Q26	2.7500	0.754	2.7500	0.452	0.00	1.000

***Table 2**: the pretest and posttest result of the **experiment** group. All indicates there is no sign of significant that each pairs are different (i.e. $p > 0.05$)*

7. Analysis of the teaching methodology

The measurement of affective outcomes or evaluative judgment is usually based on a form of attitude scale of the respondents. Attitude scales, like other scales, need to be reliable and valid. There are many problems associated with the attitude measurement[7,8].

After the study, it was found there is only similar minor shift of attitude in both groups. We have little evidence that the change of attitude is due to the difference of teaching methodology. Again, we cannot make the conclusion that shift of attitude is due to lab-based teaching.

Ideally, the lab-based approach to teaching should emphasize learning and not teaching. Students are not working alone as they can build their own understanding under the guidance of instructor. There have been conflicting findings on the comparative effectiveness of laboratory based and lecture methods. Some research found no difference in cognitive achievement of learners

[9]. But other studies found that the lecture method was inferior to instruction based on problem solving, laboratory approach teaching.

Some of these findings therefore suggested that laboratory based method, could be effective in improving the achievement of students in science and engineering [9,10,11,12]. Researchers also suggested that students' perception to laboratory approach teaching will be more positive if they wish to solve the problem [13]. The results shown above simply reflect the outcome of this experiment. Many students also reflected their views that computer-assisted homework imposed many difficulties in assessment. As suggested by Morgan, assessment is one of the major factors that will change students' perception and approach to learning [14].

CONCLUSIONS

In this paper, some of features of lab-based teaching methodology are discussed such as "learning-by-doing" and the emphasis of student-centered principle. Although the author cannot conclude there is a significant in shift of attitude after imposing the lab-based teaching, some advantages of laboratory approach teaching were experienced. They are summarized as:

1. Lab-based class can well integrate according to an overall course plan;
2. Activities of lab-based teaching/learning are largely student-based and monitored by instructors; and
3. Lab-based teaching may be effective for certain students to establish a positive attitude toward the professional but may not be as effective for others.

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